VOL. XXVI. Nº 2. FEBRUARY 1941

MECCANO MAGAZINE

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Next Month: THE WORKING OF "BANKED" TRAINS. Publishing Date: 1st March

MECCANO MAGAZINE

Editorial Office:
Binns Road, Liverpool 13
England

Vol. XXVI. No. 2
February 1941

With the Editor

Forthcoming Articles

I am greatly disappointed this month to be unable to publish the promised article on the Fleet Air Arm. This was to have been written by Commander Pursey, R.N., whose articles in previous issues have been so popular. Unfortunately Commander Pursey has been down with a bad attack of influenza, and although he tried hard he was not able to complete the article. I hope to publish it next month.

I have several interesting articles in preparation dealing with various aspects of the work of the Navy, Army and Air Force, written by experts who are already well known to readers. Other articles will deal with a remarkable series of commercial motor vehicles fitted with mechanical devices that enable them to dispose of their loads in an extraordinary variety of ways to suit different circumstances. From Mr. D. S. Barrie comes a description of the working of "banked" trains and of the special regulations that govern their operations; "Railway Engineer" gives a fascinating account of L.N.E.R. "Atlantics"; and Mr. T. R. Robinson has in hand stories of a bakery that turns out loaves by the thousand without one of them ever being touched by hand, of how paint is mixed and made, and how seeds are tested, packed and distributed. Miscellaneous articles will deal with the repairing of ships by electric welding; a famous Diesel-electric train; and a remarkable steam road locomotive of 1878. There will be also descriptions, with all details that can be made public, of the new aircraft now coming into service.

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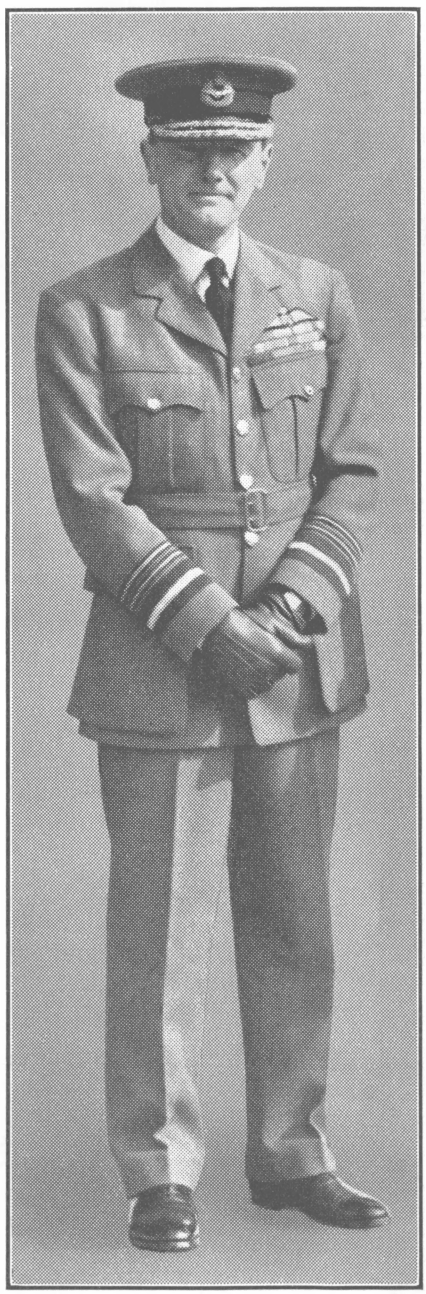
In view of wartime postal difficulties I have decided to extend by a month the time allowed to Overseas entrants in competitions. The increase takes effect this month.



Air Chief Marshal Sir Arthur Murray Longmore, K.C.B., C.B., D.S.O., Air Officer Commanding-in-Chief, Middle East, R.A.F.

Leaders in the War
XV.—Sir Arthur M. Longmore

Air Chief Marshal Sir Arthur Murray Longmore is an Australian, and was born in 1885. He entered the Royal Navy in 1900, but became keenly interested in aviation and was among the first four Naval officers granted permission by the Admiralty to learn to fly. They were trained at Eastchurch, and the Royal Aero Club's pilot's certificate granted to Longmore on 25th April 1911, is now the oldest one in the Royal Air Force. During 1912-13 he was an instructor at the Central Flying School.

He served in the war of 1914-18, and in October 1914 formed one of the first Naval air squadrons. He was in H.M.S. *"Tiger"* at the battle of Jutland on 31st May 1916. After much active service in France he was sent to Malta, and from that base flew a good deal over Italian waters. He was mentioned in dispatches and awarded the D.S.O., and also received French, Belgian and Italian honours.

After the war he was sent to Bulgaria as President of the Inter-Allied Aeronautical Control Commission. Then followed a period as Director of Equipment at the Air Ministry, but in 1924 he was abroad again, this time as Chief Staff Officer in Iraq. From 1929 to 1933 he was Commandant of the R.A.F. College at Cranwell, and afterwards was Air Officer Commanding, Inland Area, R.A.F., and from 1934-6 was in command of the Coastal area, eventually renamed the Coastal Command, R.A.F.

In 1936 he became Commandant of the Imperial Defence College, and he was a member of the British Air Mission to Australia and New Zealand in 1939. When back in England again he was made Air Officer Commanding-in-Chief, Training Command, R.A.F., and he is now Air Officer Commanding-in-Chief, Middle East.

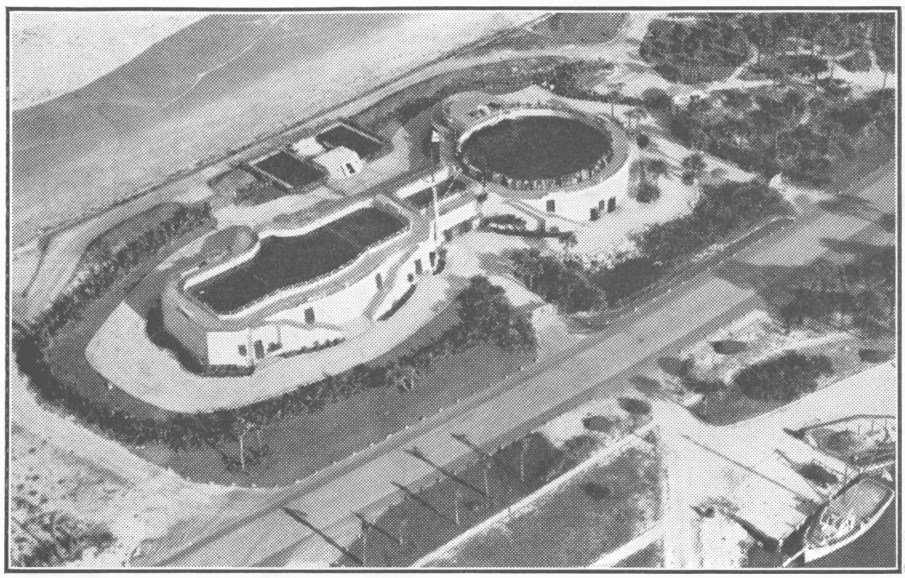
The World's Largest Aquarium Tanks

Ocean Life Seen Through 200 Portholes

By F. P. Huggins

WHEN Merium C. Cooper was filming the jungle picture "Chang," he employed an entirely new technique in the matter of recording the movements and habits of the animals. Instead of sending his cameramen on "safari" every time he required certain shots, they merely made their way to a large corral where all the animals required for the film were at large. The resulting picture astounded the world of science. This idea appealed to Douglas Burden of the American Museum of Natural History who was conducting a scientific expedition through the wilds of Siam at that time, and saw the film being made. He wondered whether the same idea could be applied to marine life.

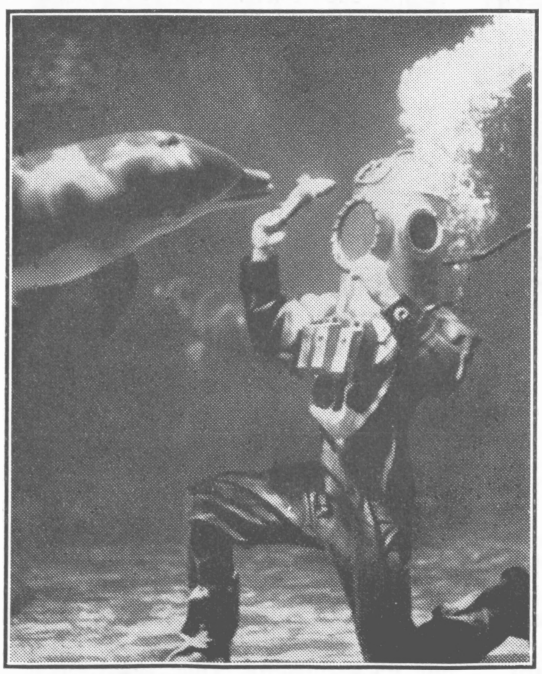
Returning to New York he outlined his plans to Leo Tolstoy, grandson of the Russian author, and the two were soon making preparations for the construction of the world's only oceanarium and only specially designed underwater motion picture studios. To-day, the fascinating community of Marineland is an established fact. Built at an approximate cost of a million dollars, these mammoth aquariums are attracting scientists, laymen and motion picture technicians from every part of the globe.



An air view of Marineland, showing Marine Studios, the world's only Oceanarium and only specially-designed underwater motion picture studios. In the foreground is seen part of the Marineland fishing fleet.

Constructed primarily for underwater photography, marine studios offer the camera enthusiast colourful scenes duplicated nowhere else in the world. Two giant tanks, one a rectangular tank 100 ft. long and 18 ft. deep, and the other a circular tank 75 ft. in diameter and 15 ft. deep, comprise the oceanarium. More than 200 large observation portholes have been placed in strategic positions in the sides and bottoms of the two tanks, affording a clear picture of the parading colourful undersea world.

The site, on the palm-fringed shore near St. Augustine, Florida, and not far from the famous Daytona Beach, is an ideal one. Quite near a rushing stream of traffic; all the marine life an ocean covers in the blue Atlantic beyond; strong light for the camera-men and a favourable climate—all these were strong points for choosing this spot. In addition to these advantages, just near the shore was a bed of coquina rock, which could be made to serve as a natural filter for the pumps.

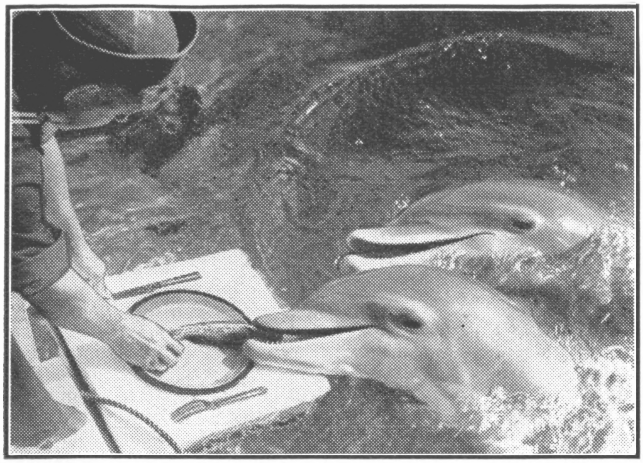


A Marine Studios diver goes below in 18 ft. of water to feed a large porpoise by hand.

It took a year to complete the tanks, and it was decided to admit the public free on the first day. Although a large crowd was expected, the staff were quite unprepared for the 30,000 people who did arrive.

At the south end lies the main entrance, and in the lower corridor soft blue lights direct the passage of the spectators from porthole to porthole. Through these windows of wonder it is possible to see clearly the occupants of this fascinating watery world. Sea-cows, porpoises, rays, giant sharks, turtles, reef and tropical fish parade in bright review. In one end of the rectangular tank over seven tons of coral, seafans and plumes were used to duplicate a coral reef. Here gay little fish, sporting every colour of the rainbow, find protection from their predatory enemies. Fiddler crabs try to hide in the sand but are quickly nosed out by the turtles and rays. The rays feed like vacuum cleaners, sucking up a mouthful of sand, sifting it, and blowing it out through their gills. The dark red groupers change to pure white when they want to fade into a new background. A curious little chap is the yellow spiny boxfish who will come to the portholes and stare at the spectators.

Very outstanding are the black angelfish, and also the blue and gold queen angelfish with the crown



The Marineland Oceanarium porpoises are the only captive ones in the world. They have been taught to take food from a plate.

clearly marked on her forehead. Most odd of all these smaller inhabitants is the little doctorfish. Although he has a bald head and a mild manner, he carries a sharp spine along his tail, which in a fight he can stick out and so rip his enemy open. Then there are the filefish, the porcupine fish, the rainbow wrasse, the grunt, and so on, all on the small side, and too numerous to describe in detail.

Lying in the deepest part of this tank is the skeleton of a wrecked ship, and although its barnacled ribs and bow offer a certain protection for the smaller fish, its main object is to create photographic atmosphere.

Most of the larger specimens are in the circular tank, where the water is so clear that it is possible to read the headlines of a newspaper held against an opposite porthole. Here dwells mother porpoise and her youngster who is known to the staff as "Baby." The staff take a huge delight in "Baby's" antics, for she is very playful, especially with the large rubber ball they have given her. More dangerous is the 14 ft. sawfish, with its saw studded with spikes as thick as a man's thumb; and the 500 lb. jewfish who seemed quite a placid sort of chap until a shark upset him. One bite and a couple of gulps—and the shark disappeared! Then there is the 300 lb. loggerhead turtle who was once seen to bite through the thick rail of a ladder in a very casual manner; the half-ton manatee with an old bullet wound in her side; the 6 ft. moray eel whose teeth leave a raw ragged wound, and that undersea Dracula, the sting ray. He measures 4 ft. from wing to wing and his barbed lash is loaded with enough poison to kill you.

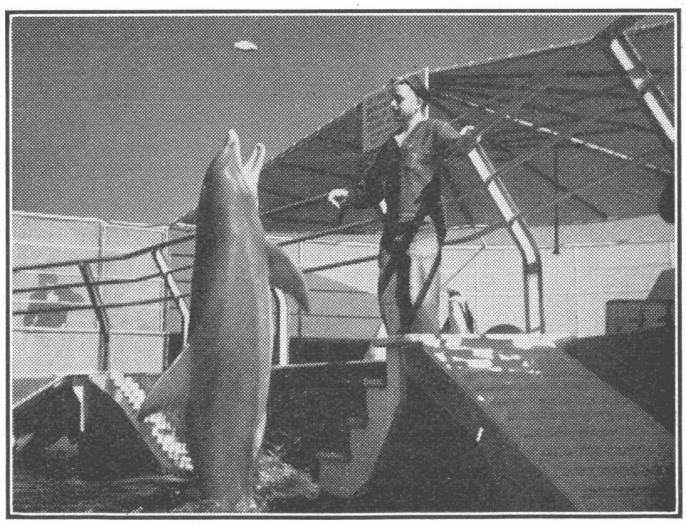
But none of these larger fish seem to bother the divers to any extent. Much more troublesome are the nips of the 2½ in. pinfish or the tickling of the shrimps.

The curator of the Studios, Arthur McBride, has had some very interesting experiences with his underwater charges. Once when a 5 ft. tarpon was brought in it was so exhausted from its fight that it was hardly breathing. McBride knew that unless it began to breathe soon it would die, so he jumped into the tank and gave it artificial respiration by hand-pumping its gills open and shut. Another time, when several giant rays were loosed into the circular tank, they were so confused that they began to swim head-on into the walls, badly battering themselves. The curator and other members of the staff, worried by the effects this might have on the fish, dived in, and catching hold of the rays' fins guided them around until they realised they had to swim in circles.

The 600 lb. porpoises and 1,800 lb. sawfish are not caught by fishermen in rowing boats. Marine Studios had to organise their own fishing fleet, consisting of a 48 ft. cruiser and three fast sea skiffs. The distinctive feature of the cruiser is a well 17 ft. long, opening through the stern by a contrivance like a canal lock. When a big fish has been netted, it is dragged into this flooded well and kept there until the ship reaches shore. Here it is transferred to a watertight canvas cradle, which is rushed to the tanks by truck. A crane hoists the cradle to the flume—a shallow trough connecting the two tanks—and the fish is released. While it is in the flume it is examined for possible disease, or stays there until the staff decides into which tank it should go. Then a gate is opened and the fish swims through.

Some of the more dangerous specimens are drugged when captured. A hypodermic harpoon was devised that contains a chamber for the drug and a capsule of compressed air as an injector. Once the fishing crew have determined the nature and size of the fish they are fast to, a special amount of the drug is poured into the injector and the needle is jabbed into its dorsal regions. The drug is so powerful that it will knock out the heaviest shark in one minute, and it is not likely to recover for 2½ hours. It gives the crew time to get him ashore and into the flume before he is too dangerous to handle.

The fishing fleet has also to supply food for the occupants of Marine Studios. Plankton, the minute organisms that infest all sea water, is used to feed the small fish, with eel grass for vegetarians manatees, and as much as 125 lb. of mullet a day for the sharks, turtles and other carnivores. There are two feeding hours a day, 11 o'clock in the morning and four in the afternoon. A dinner bell is rung underwater, and as soon as it is sounded the porpoises dash to the platform and try to snatch the mullet held over



A 1,000 lb. porpoise jumping clear of the water to accept food from the hand of an attendant.

their heads. The manatees, jewfish and turtles also are learning to feed from the hand, but the sharks, as you can guess, still get theirs thrown to them.

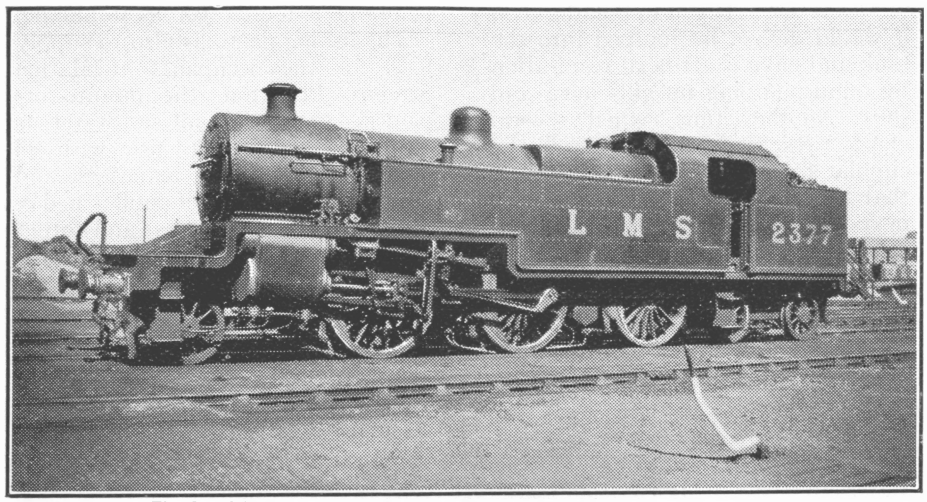
McBride regulates the food as carefully as possible, and also keeps records of everything of scientific significance that he observes in the tanks. Study of the porpoises alone has revealed three facts that were not known before. They sleep with their eyes closed; (Continued on page 70)

A Remarkable Local Train Service

Pre-War Feats of L.M.S. Tank Engines

By a Railway Engineer

A TRAIN service does not need to involve long-distance running to be interesting; in fact some purely local districts have many features of operation which, in their contrast to main line working, make quite an absorbing study. One such district is that of the L.M.S. between London and Watford. I am referring now not to the electric services, which are in a class apart, but to the steam-operated residential traffic to Euston and Broad Street. Not even in the busiest morning and evening periods could the service be called "intense," in the sense applied to train working on the Tilbury section, for example; close headway working on the Watford line is confined to the electric trains, but the steam services are exacting enough in themselves. Station to station runs are fairly long, booked times are extremely fast, and a very high standard of locomotive performance was demanded by the services operated up to the outbreak of war. Even now plenty of hard work is called for, though the evacuation of many businesses from London, including of course the L.M.S.R. headquarter offices, has considerably eased matters during the rush hours.



The first L.M.S. type of 2-6-4 tank built under Sir Henry Fowler's direction.

The work done by the locomotives engaged on such a service is more arduous than might be imagined. Although there is no station-to-station distance less than one-and-a-half miles in length, the frequent stopping and starting means hard pounding, with such smart timings, and unless engines are well designed the coal consumption may well be high. Loads are usually six to eight bogie coaches, but even though this represents not more than 230 tons, one has only to travel in the trains and listen to the sharp exhaust beat during the time of rapid acceleration to realise what is involved. Then, of course, the more important business trains, running non-stop between Watford, or Bushey, and Euston or Broad Street, are timed at real express speed, and something very near to 60 m.p.h. must be sustained up the 1 in 335 gradient from Wembley to the summit near Carpenders Park if bare schedule time is to be kept. Even with a train of only six or seven coaches this means a first-rate locomotive if the job is to be done economically.

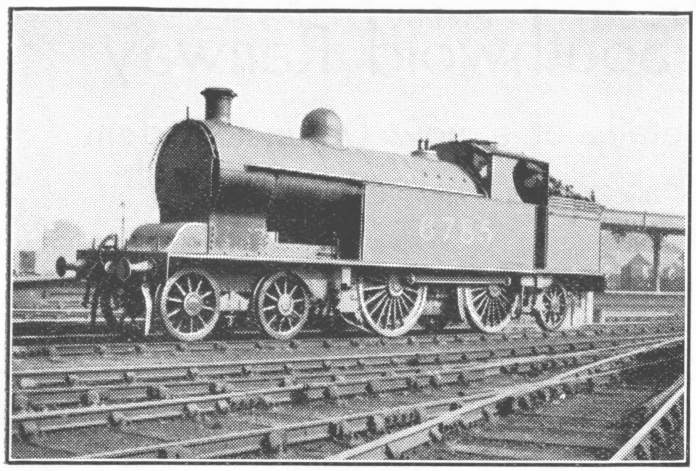
The work does not end with the actual haulage of passenger trains. The stud of tank engines stationed at Watford Junction are used for all kinds of duty in and around Euston. In the late afternoon out they go to the carriage sidings to bring in empty coaches forming long-distance expresses. They stand in the platforms at the rear of these trains for half an hour or so, performing, in winter, the valuable service of warming the carriages; and then they give the train engine a good send-off by pushing in rear to the top of the Camden bank. These duties are closely dovetailed in with the suburban train workings; one regular roster worked by a Watford tank engine used to involve bringing in the empty coaches for the 6.10 p.m. express, banking out to Camden, and then running down into Euston again to take the 6.37 p.m. to Watford. Northward from their home station they work locals, to Tring and Bletchley, but instances have been recorded when these tank engines have been requisitioned to haul main line expresses in cases of failure of the train engines. On one such occasion a 2–6–4 tank came very near to keeping sectional times with a down two-hour Birmingham express!

Until 1932 the 4–4–2 "Precursor" tanks of the former L. and N.W.R. were mostly used, helped out on the lighter duties by veteran Webb 0–6–2 tanks, and even on occasions by 0–6–0 tender goods engines. In that year however the standard L.M.S. 2–6–4 tanks came on the scene. These were of the parallel boiler variety designed under Sir Henry Fowler's direction, and built at Derby. It was evident at once that they were very efficient engines, running for the most part in absolute silence, with valves often linked up to less than 10 per cent. cut-off; and although their coupled wheels were only 5 ft. 9 in. in diameter, against the 6 ft. 3 in. of the L.N.W.R. 4–4–2s, there was no comparison between the two types so far as speed was concerned. This is indeed an astonishing example of how misleading the dimensions usually quoted in connection with locomotives can be as a guide to their actual performance on the road. The cylinders are the same in both cases, 19 in. diameter by 26 in. stroke; the total heating surface is 1867 sq. ft. in the 4–4–2 against only 1486 sq. ft. in the 2–6–4; and the boiler pressure is 175 lb. per sq. in. in the 4–4–2, against 200.

Since 1932 three further varieties of a 2–6–4 tank have worked on the Watford locals, all taper boilered and designed by Mr. Stanier. The first were the well-known 2500–2536 series, with three cylinders and a domeless boiler; these engines have now all been transferred to the Tilbury section, and I dealt with their work in the "*M.M.*" for April 1938. After this trial of 3-cylinder propulsion Mr. Stanier reverted to two cylinders, though larger than those of the original Fowler engines, for what has now become the standard L.M.S. type of express passenger tank engine. The Stanier engines, with cylinders 19½ in. diameter, are designed for even more rapid acceleration than that of which the original 2300 class were capable; and the newest examples with domed boilers and the characteristic top feed arrangement, certainly excel in this respect. Whether they are as fast as the Fowler engines is a moot point, but then even the Watford locals do not regularly demand maximum speeds of over 80 m.p.h. Readers may well raise their eyebrows at this remark, but some of the runs about to be mentioned involved some truly extraordinary speeding.

The Watford drivers were very quick in getting the measure of the 2-cylinder 2–6–4s—very commendable this, because the method of handling them needs to be quite different from that habitually used on the "Precursor" tanks. For the first month or so this keen link of enginemen seemed thoroughly to enjoy the speed developed when the 2–6–4s were fully notched up and allowed to run, and their zest often took the form of racing the main line expresses. No less celebrated a train than the down "*Merseyside Express*" used often to suffer the indignity of being overhauled by a local, in the days when the departure time from Euston was 5.55 p.m. The 5.53 p.m. to Watford was the challenger; this used to run smartly out to Wembley, its first stop, and then just as it was restarting the Liverpool train would sweep majestically through at about 60 m.p.h. The Watford driver would then give chase, and as the speed of the express fell off while climbing the 1 in 335 incline, the local would draw level. Neck and neck they would race through Harrow, at about 55 m.p.h.; but a "Royal Scot" with 14 or 15 bogies was no match for a 2–6–4 tank with only 6 or 7 on, and many times we reached Bushey and were leaving the platform before the "*Merseyside Express*" came through.

The rearrangement of the timetable, whereby the "*Lancastrian*" left at 6 p.m.



A "Precursor" tank of the former L.N.W.R., the type that worked the suburban services out of Euston until 1932.

and the "*Merseyside Express*" at 6.5 p.m., put an end to this racing, but the acceleration of the suburban trains themselves gave the Watford drivers a further opportunity to show what they could do. On countless occasions when returning home from business in the evenings I timed excellent runs on the 5.53 p.m. from Euston. The initial run of 8.1 miles out to Wembley used to involve a smart climb up Camden bank, a swift acceleration along the level to nearly 60 m.p.h. by Queens Park, at which point steam was shut off for an easy run through the slow line platforms at Willesden Junction; and a lightning acceleration to Brent Junction before slowing for the first stop. Then, night after night, we would accelerate to 60 m.p.h. on the 1 in 335 from Wembley. But of all these runs, so uniform that one grew scarcely to notice the performance, a trip by No. 2376 stands out as fairly phenomenal. On this particular night the load was 177 tons, and with this speed rose to 54½ m.p.h. in just two miles from the start; as early as Harrow we were doing 61½ m.p.h., and then No. 2376 blazed away—climbing all the time—to 66½ through Hatch End, and to storm over the summit at the amazing speed of 68½ m.p.h.! All this, be it noted, had happened in the modest distance of 6½ miles from the dead start. As a result the 7.9 miles from Wembley to Bushey were completed in the somewhat astonishing time of 9 min. 33 sec., start to stop.

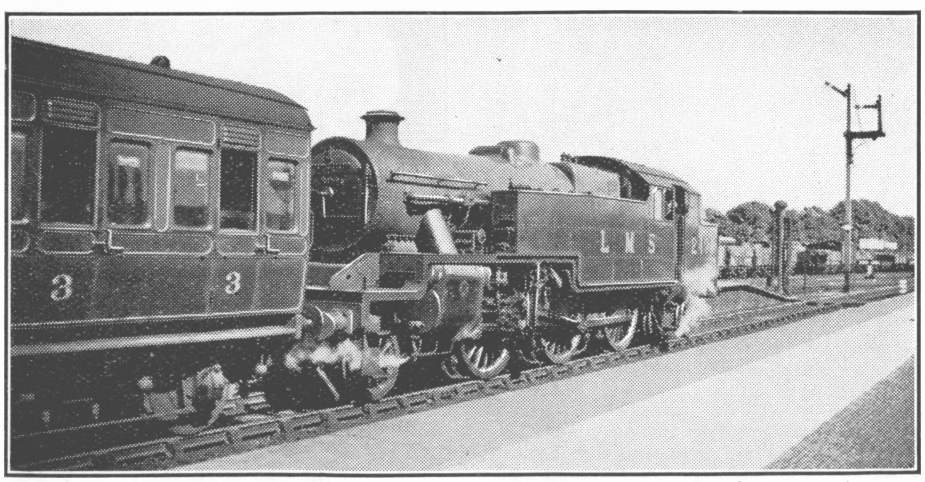
But to see suburban train working at its finest one had to travel on the 8.26 a.m. up from Bushey. This carried an enormous load of 11 non-corridor bogies, and careful counts taken by the authorities on several occasions showed that the train reached Euston with, on an average, 1000 passengers on board! The load from Harrow inward was 370 tons. This in itself would be a stiff proposition from the haulage point of view alone; but the utmost skill had to be displayed at Bushey and Harrow in drawing up, so as to fit the train to the platforms. The usual stopping time at these stations was about 40 seconds, during which 300 to 400 passengers entrained, so one can well imagine the delay that would occur if the driver misjudged his stop and overran the platform. From Bushey to Euston booked time was 28 minutes, for the 16 miles; this included the brief stop at Harrow and a stop for ticket examination at Willesden Junction. Here again the "slickness" of the working was extraordinary, for the station staff inspected every one of the thousand season-tickets and got the train away in less than three minutes without fail. It was no perfunctory examination either, as a fellow-traveller without a ticket found to his cost one morning!

The locomotive work was invariably splendid. Here are some details of a typical run with one of the Fowler engines, No. 2322. Starting finely from Bushey we were doing 56 m.p.h. in 2¾ miles from the start, and touched 61 before shutting off steam for Harrow. It was remarkable to see how drivers always kept full steam on to the very last minute, then braking fully brought the train to a stop exactly at the right spot. On this trip the 1.9 miles from passing Hatch End to stopping at Harrow took 2 min. 16 sec.—an extraordinary, though quite everyday feat. The 4.6 miles from Bushey took 7 min. 7 sec. start to stop. After a halt of 48 sec. we got away well on the falling 1 in 335 grade from Harrow, and after reaching 50 m.p.h. the engine was linked right up, and the exhaust beat could not be heard. A maximum speed of 61½ m.p.h. was attained at Brent Junction, and full speed maintained till within half a mile of Willesden Junction; then again came that beautifully judged stop. The 6 miles were run in 8 min. 8 sec. This was actually the morning of the ticketless passenger, so that we stayed longer than usual at Willesden—3 min. 17 sec. to be precise; then No. 2322 made a smart run to Euston, 5.4 miles in 9¼ min. accelerating to 52 m.p.h. in 3 miles of level road.

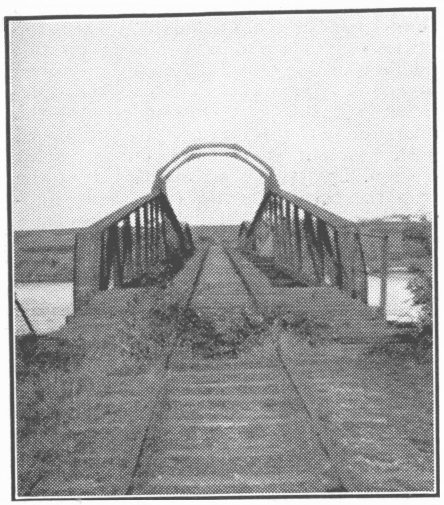
During the short time the Stanier 3-cylinder engines were at Watford one of them, No. 2502, gave me the fastest times I have ever noted on the 8.26 a.m. up. Between Bushey and Harrow we attained 63 m.p.h.; then from the Harrow start we passed Brent Junction, 4.4 miles in the very fast time of 5¾ min. doing 65 m.p.h., and a wonderfully fast restart from Willesden took us into Primrose Hill tunnel at 54 m.p.h. and enabled us to stop at Euston in 8¾ min. Yet even on this fine journey we only fractionally improved upon the strenuous demands of the timetable. Not the least striking part of the operation of this train was the speed with which it was cleared on arrival at Euston. Less than two minutes after the stop the empty coaches were being propelled out to the sidings by the train engine, and this feat was repeated invariably each morning. On this heavy duty the work of the Fowler and the Stanier 2-cylinder locomotives was indistinguishable in its regularity.

For really spectacular running however one had to travel by the lighter suburban trains. The 9.1 a.m. from Bushey, after making stops at Hatch End and Harrow, always reached 70 m.p.h., or so, on its 11.4 mile run from Harrow to Euston. Its running was so regular that I rarely timed in detail, until one morning when, after passing Brent Junction at the usual 68–69 m.p.h. I noticed that we were travelling unusually fast through Willesden. My stop watch thereupon "went into action" and duly clocked a thrilling dash through Kilburn at no less than 76 m.p.h.! But for sheer speed the 8.53 a.m. non-stop from Watford Junction to Euston easily tops the bill. This was worked by a Bletchley engine during the week, but on Saturdays the Watford tank engines were used; the load was only one of 6 coaches, but the pace was electrifying. The story of these 2–6–4 tank engines and their work is aptly summed up by the description of the fastest run I have ever noted during 10 years of daily travelling between Watford and Euston.

A Fowler engine, No. 2387, was concerned, and the load was 185 tons. I should mention too that the locomotives are almost always running bunker first on the up journey, so that the steadying influence of the bogie is available when travelling fast. I have noted faster starts over the level 3 miles from Watford, as we were doing only 56 m.p.h. when we began the 1 in 335 descent; but then No. 2387 fairly ran riot, and we passed Harrow at 75 m.p.h., Wembley at 81, and swept across the Brent viaduct at no less than 83½ m.p.h. Even though we were now down on level road there was no perceptible slackening; Willesden Junction was passed at 80½ m.p.h., Kilburn at 79½, and we entered Primrose Hill tunnel at 74. The 15.1 miles (*Continued on page 70*)



A Stanier 2-6-4, No. 2494, leaving Watford for Euston; as usual the engine is running bunker first on the up journey.



Approach to the swing bridge over the River Blyth. Note the blackberry bush on the track!

The Southwold Railway

Some Details of a now Defunct System

By Ronald H. Clark, A.M.I.Mech.E.

THE Southwold Railway must have been known to a fair number of readers during the latter part of its existence, and some I venture to believe may have travelled on it for a "joy ride."

The railway was incorporated by Act of Parliament in 1876, being opened for traffic on 24th September 1879. It closed down finally on 11th April 1929 after a life only a few months short of half a century. The gauge was 3 ft., and the line connected Halesworth, in Suffolk, on the main line of the former G.E.R. from Liverpool Street to Yarmouth, with the neighbouring seaside and port of Southwold, nine miles away on the coast.

Three small locomotives, all tank engines, constituted the first locomotive stock. These were named *"Southwold," "Halesworth"* and *"Blyth,"* and were numbered respectively 1, 2 and 3. *"Southwold"* had the 2–6–0 wheel arrangement and the others were 2–4–0s. At first the traffic was insufficient to warrant the use of three engines, so No. 1 *"Southwold"* was returned to the makers, the world-famous Sharp, Stewart and Co Ltd. of Atlas Works, Manchester. In 1893, however, a third engine became necessary, so Sharp, Stewart and Co. Ltd. supplied another engine which was numbered 1 and named *"Southwold"* after its predecessor. This had the 2–4–2 wheel arrangement.

During the Great War, in 1915, the company constructed a mile-long branch to the harbour at Southwold; and in anticipation of extra traffic had already ordered in 1914 a fourth engine No. 4 named *"Wenhaston,"* built by another famous firm, Manning, Wardle and Co. Ltd. of Leeds. It was a six-coupled tank engine of the 0–6–2 type.

These engines were resplendent in a livery of blue lined out in red, and they were kept very clean. Now, alas, No. 1 has been scrapped, Nos. 2 and 4 are rusting away in their running shed adjacent the high road at Southwold, and No. 3 is facing the same fate in its little shed at Halesworth, usually the Mecca of juvenile amateur drivers on a Sunday afternoon!

The other vehicles comprised six passenger carriages where the occupants sat facing each other, built by the Bristol Tramway and Carriage Co. Ltd., and 32 goods vehicles, some of which were made by the Midland Railway-Carriage and Wagon Co. Ltd., and some by Thomas Moy of Peterborough. Some of this stock had been made for the ill-fated Woosung Tramroad, the first railway in China.

Leaving Halesworth the line descends at 1 in 66 into the valley of the River Blyth, skirting the village of Holton through verdant meadows, the track at this part being covered shoulder high with vigorous weeds! Half-way between Holton and Blyford it crosses the Blyth by a pile bridge set in as picturesque a scene as one could desire. Nut boughs, alders and may trees now encroach on either side and blackberry brambles hide the sleepers. This type of bridge comprised large piles driven into the river bed to support the wooden horizontal members. One span utilises rolled steel joists. Timber sleepers are laid across these big sections and on them are spiked the flat-bottomed rails.

Being now on the south side of the river the line turns slightly southward to Wenhaston, known for its post windmill, the station now utterly grown up with young sycamores, alders, hawthorns and copious weeds! The platform is quite invisible and the solitary double-armed signal with both arms at danger looks very forlorn. The coal-weighing machine is still to be seen complete with pan.

Two miles from Wenhaston, Blythburgh Church is seen from the west side and the single track now turns north and then curves easterly to the derelict station flanking the village on the north side. At Blythburgh station there was a crossing in order that trains might pass each other. Part of the premises, well known in being near the bridge on the main road, form now a chicken house.

After leaving Blythburgh the course of the track skirts the south side of the upper estuary of the River Blyth so that the traveller was greeted with the delightful mixture of a large expanse of water on one side and thick pine belts on the other, truly one of the most picturesque spots in Suffolk. The railway is no more, but the dignified and stately heron still nests in the tops of the pines on Hill Covert.

Next comes Walberswick station at the end of Tinker's Walk, as decrepit as its companions, with a solitary signal on guard on the Southwold side. A large obstacle has now to be overcome in the form of the River Blyth, here a large and tidal river. In the early years a pile bridge carried the line across. Later, in 1907, a fine swing bridge was substituted to permit of navigation higher up the river. This bridge was manufactured by Francis Morton and Co. Ltd., Engineers and Ironfounders, of Garston near Liverpool. It has not been opened to river traffic since 1914.

Leaving the swing bridge with its accompanying tang of the salt creek, the branch from the harbour joins up and the rusty metals traverse another cutting skirting the golf links, and so after nine miles Southwold station is reached.

The speed was limited to 16 m.p.h. as the line was built before the Light Railways Act was passed allowing a limit of 25 m.p.h.

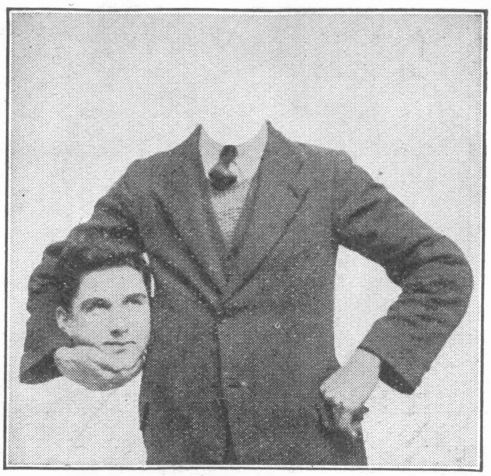
Engine No. 3 "Blyth" of the Southwold Railway. It hauled the last train to run on the line, in 1929.

Four trains were run on weekdays each way, the down trains leaving Halesworth at 8.40 a.m. and 1.0, 3.5 and 6.37 p.m. On Sundays the summer service was one train each way to the end of the autumn fishing.

The company issued a most comprehensive Live Stock Way Bill covering horses, bulls, neat cattle, rams, sheep, pigs, asses or mules, dogs and "other Quadrupeds." The last category must have saved the staff a multitude of worries!

But by 1927 the freight receipts started to drop with the advent of a frequent bus service between Halesworth and Southwold, charging 10d. for the single journey as against 1½d. per mile on the railway. So on 11th April 1929 the little *"Blyth"* pulled the last train to Halesworth.

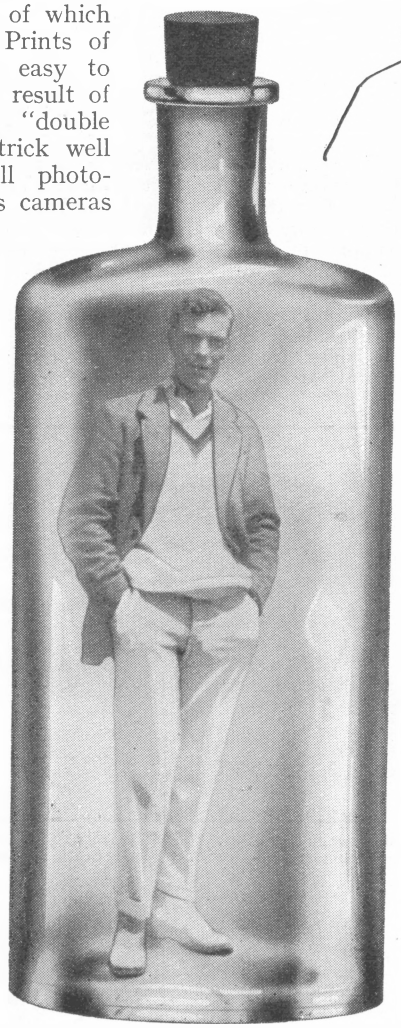
PHOTOGRAPHY



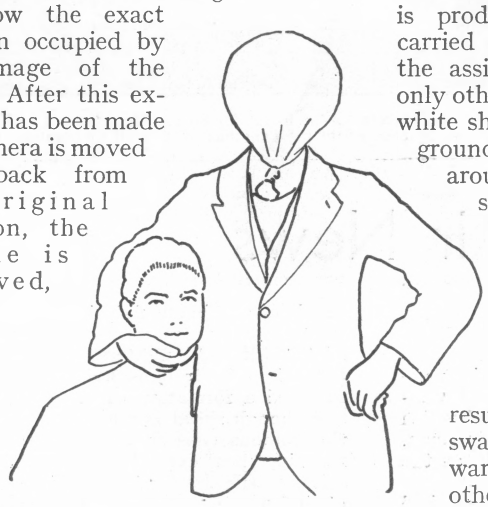
Trick Photography

TABLE-TOP and other indoor work is still the main activity of many amateur photographers, for it will be some weeks yet before most of us feel the urge to take up outdoor photographic activities again. Fortunately there is ample variety in the photographs that can be taken indoors, even when only a simple camera is available. In the past two issues of the "*M.M.*" I have dealt with the wide possibilities of table-top work; this month I discuss what may be called trick photography, a branch of the hobby that provides equally wide scope for ingenuity.

A very old and well-known trick photograph is "The man in the bottle," an example of which is reproduced here. Prints of this kind are quite easy to produce and are the result of what is known as "double exposure." It is a trick well worth trying by all photographers who possess cameras fitted with a focussing screen, and can always be counted on to mystify the uninitiated. A large bottle is required, preferably of the square type, and a dark-coloured background of an unpatterned material such as a sheet of dark brown paper. The sitter should if possible be attired in light-coloured clothing so that he will appear in strong contrast against the background.



The bottle is first photographed at close quarters in order to obtain the largest possible image. If the camera used has double extension this will be quite simple, but failing this a large image can easily be obtained by placing a portrait attachment in front of the ordinary camera lens. When the bottle has been focussed, tiny pieces of stamp paper must be stuck on the focussing screen to show the exact position occupied by the image of the bottle. After this exposure has been made the camera is moved well back from its original position, the bottle is removed,



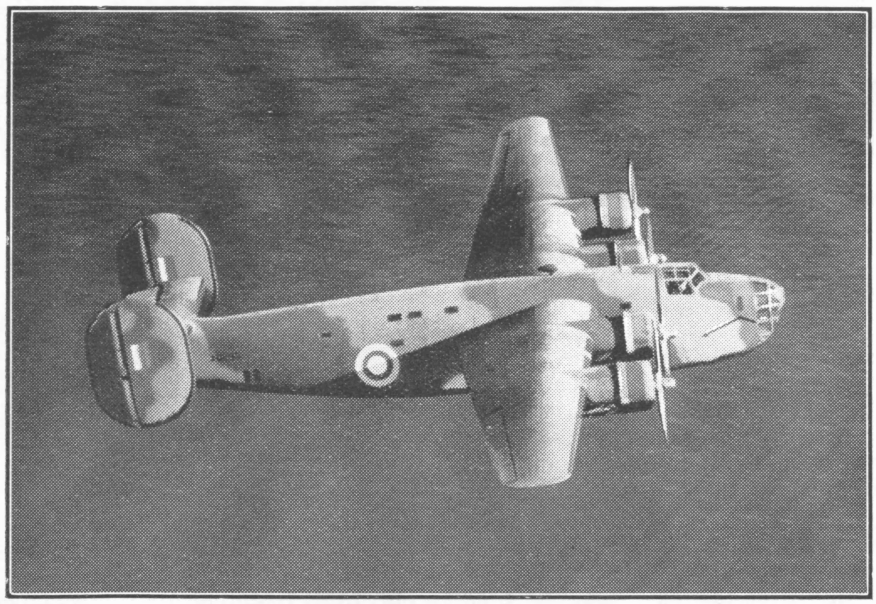
and the sitter is then posed in its place and carefully focussed so that his image comes well within the area enclosed by the pieces of stamp paper. The plate on which the bottle was photographed is now replaced in the camera and a second exposure on the sitter is given. If proper care is taken in placing the images on the plate, the resulting print will show the man unmistakably imprisoned inside a huge bottle!

Probably the most mysterious photographic trick is the "headless man." The upper illustrations on this page reveal the idea and the means by which the illusion is produced. This trick can be carried out with a box camera and the assistance of two friends. The only other requirements are two large white sheets, one to serve as a background and the other to be wrapped around one of the sitters; and a small white cloth to cover the head and neck of the other sitter.

The two persons should be of similar build and height, as any marked differences will reduce the effectiveness of the finished result. One of them must be swathed from the neck downwards in a white sheet, while the other, whose head is covered with the smaller white cloth, holds the former's head in his hand as shown.

The negative should be slightly over exposed, and as an image of sharp contrast is wanted, development must be prolonged until a considerable degree of density has been built up in the negative. The prolonged development, coupled with over-exposure, will blot out the shadow detail that otherwise would appear in the "shroud."

Another popular trick photograph is the "ghost" picture. Let us suppose that it is desired to photograph a friend with a "ghost" standing behind him. First the friend and the "ghost," who is covered from head to foot with a white sheet, are placed in their respective positions. A photograph is taken giving only one-half the full exposure required. The ghost then walks out and the second half of the exposure is given, the sitter keeping perfectly still between the two exposures. The negative will then show the sitter and the scene properly exposed and only a thin transparent image of the ghost will appear in the view.



One of the four-engined Consolidated Model 32 Bombers for the Royal Air Force. The type will be known in the R.A.F. as the "Liberator." Photograph by courtesy of the Consolidated Aircraft Corporation, U.S.A.

Air News

American Four-Engined Bombers for the Royal Air Force

The upper photograph on this page shows one of the big four-engined Consolidated Model 32 bombers, 120 of which have been ordered for the Royal Air Force. They will be known in the R.A.F. as the "Liberators."

The new bomber is similar to the original Model 32, first flown late in 1939, and which marked the re-entry of the Consolidated Aircraft Corporation, U.S.A., into landplane production. It incorporates the latest military features designed to meet the combat requirements learned from the present war. Performance figures are confidential, but according to the official statement on the original aircraft this had a speed of over 300 m.p.h., a range of approximately 3,000 miles, and a bomb-carrying capacity of approximately four tons.

The great range of the Consolidated Model 32 will enable it to make a non-stop flight from England to almost any sector in the European war area, and back, with a full bomb load on the outward trip. It is claimed that its speed, and defence and attack armament give adequate protection from enemy attack. The photograph shows the machine to be a high wing monoplane, and it has three-wheel retractable landing gear, with the single wheel forward. The number of the crew carried will vary with the job to be done.

"Gladiators" Beat Italians in Western Desert Battles

British, Canadian, and Australian fighter pilots have been gaining glory in encounters over the Western Desert with fighter and bomber aircraft of Italy's Air Force, the Regia Aeronautica. Among the machines they have used is the Gloster "Gladiator," last of the long line of fighter biplanes adopted by the Royal Air Force. Often these pilots have fought against superior numbers, and in one fight in Egypt recently six "Gladiator" pilots met and routed 18 Fiat "C.R. 42" fighters. In another air battle four Australians, flying "Gladiators," smashed a formation of 17 "C.R. 42s."

Although speed is not the chief asset of this famous Gloster aircraft, probably no machine has ever been designed more suited to the close and intricate manœuvres of air fighting. Some of the most spectacular aerobatics and breath-taking formation flying at Hendon Air Displays before the war were carried out by "Gladiators." As the first British fighter to mount more than two guns—four being its standard armament—it was the first multi-gun fighter to go into service. "Gladiators" were also used for the high-altitude "weather flights" which were a feature of pre-war days.

The "Gladiator" is a single-seat, metal biplane with wings of about 32 ft. span, or 5 ft. less than the "Spitfire." It has an 840 h.p. "Bristol" Mercury engine that gives it a top speed of around 255 m.p.h.

More American Air Routes Planned

The Federal Airways system of the United States Civil Aeronautics Board now totals 28,745 miles, of which only 3,956 miles are not yet fully equipped with aids to navigation. The 1941 plans of the Board include the construction of nine new air routes, totalling 2,469 miles, and 26 radio range stations. All the new routes will be over 100 miles long, and the longest will cover 508 miles, linking Cheyenne and Huron.

Pre-entry Training for the Royal Air Force

A splendid response is being made to the recently-announced pre-entry training scheme for the Royal Air Force, introduced to meet the growing demand of the R.A.F. for pilots and air crews from the home country, and to ensure an adequate flow of suitable young men for these jobs and for the various technical trades of the Service.

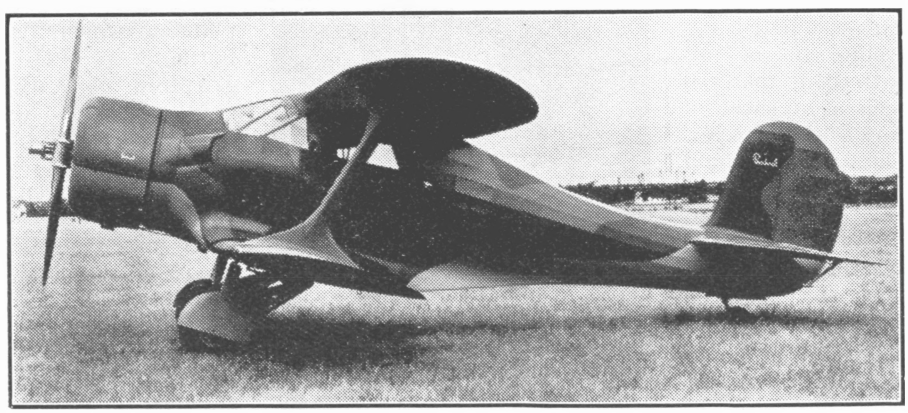
The main feature of the scheme is the establishing of an Air Training Corps, which will consist of University air squadrons, squadrons and flights formed from schools, and units organised locally. From two to four flights of 50 boys each will constitute a squadron, and large cities and towns will each have several squadrons. All boys of 16 and upward, who are physically fit and desire to serve eventually in the R.A.F. or Fleet Air Arm are eligible to join this Corps. Boys who are suitable for flying duties will carry out a syllabus like that of the Initial Training Wings of the R.A.F., and special courses will be given to those who are suitable for mechanical and wireless trades.

A Newport squadron is the first to be formed under this training scheme.

New Bombers and Fighters in the Royal Air Force

New, faster and more formidable types of British aircraft are now in service with the Royal Air Force, and a few details concerning some of them have been revealed. The biggest newcomer is the Short "Stirling" four-engined long range flying boat, which is said to be larger and faster than the huge "Flying Fortresses" from the United States.

A new fighter, reported to be the fastest machine of its kind in service with the Fleet Air Arm, is the Fairey "Fulmar." It is armed with eight guns in the leading edges of the wings and they are operated by the pilot. Other new British single-seater fighters for the R.A.F. are the Hawker "Tornado" and the Westland "Whirlwind."



A camouflaged Beechcraft D17R single-engined biplane. The D17R seats a pilot and three passengers, and has a cruising speed of 202 m.p.h. Photograph by courtesy of the Beech Aircraft Corporation, U.S.A.

More Boeing "Clippers" for Pan American Airways

A new fleet of six super-"Clipper" flying boats for Pan American Airways is in production at the Seattle plant of the Boeing Aircraft Company, U.S.A. The wing centre-sections of these giant boats are built separately and upside down, because they are easier to assemble that way; and the top photograph on this page shows one of these sections being turned over in the process of moving it into the main hull jig. It weighed two tons, and there was very little clearance as it was turned by Boeing mechanics working chain blocks and tackle.

The new flying boats, known as the Boeing Model A-314s, are of the same design and size as the Model 314 "Clippers" now in service, but they have important improvements, including greater horse power and fuel capacity. Each of the boats will be fitted with 1,600 h.p. Wright "Cyclone" engines and 14 ft. 9 in. diam. airscrews. The fuel tanks built into the stabilisers, or stub wings, have been increased in size to carry an additional 1,200 gall. of fuel, making the total 5,400 gall. and giving the boats greater non-stop cruising range.

Pan American Airways are using their present six Boeing 314 "Clippers" on three transoceanic trade routes—across the Atlantic from New York to Lisbon, Portugal; across the Pacific from San Franscisco to Hong Kong, China; and from San Franscisco to Auckland, New Zealand.

"Severe Icing Conditions"

Frequently in news bulletins and R.A.F. pilots' stories the phrase occurs "we found severe icing conditions." Ice is one of the troubles which sometimes beset our bomber pilots on their long flights, but most of these airmen are so experienced that they can avoid serious consequences by taking proper action. They may have to come lower, and find a slightly warmer temperature, or they may go much higher and find conditions cold but dry. Occasionally, however, they cannot get out of the icing conditions by either move; the humidity and temperature are against them. Then it is a matter of real airmanship, and often is an anxious time.

Recently one R.A.F. pilot returned from a long trip with a smile—and a very black eye. He had flown a heavy bomber across to a particular target in Germany, and the enemy suffered from his visit. On the way his aircraft iced up so badly that the airscrew threw off ice in disturbing quantities, and one particularly large piece came off with such force that it broke through the glazing of the cockpit and almost knocked him out, hitting him squarely in the face. Only the fact that the glazing had checked the force of the blow saved him from more serious injury, and he reached home and landed his aircraft safely.

British Airways Fly Five Million Miles in 1940

During 1940 British civil aircraft flew 5,000,000 miles, and in addition to conveying passengers and freight, carried nearly 30,000,000 air mail letters.

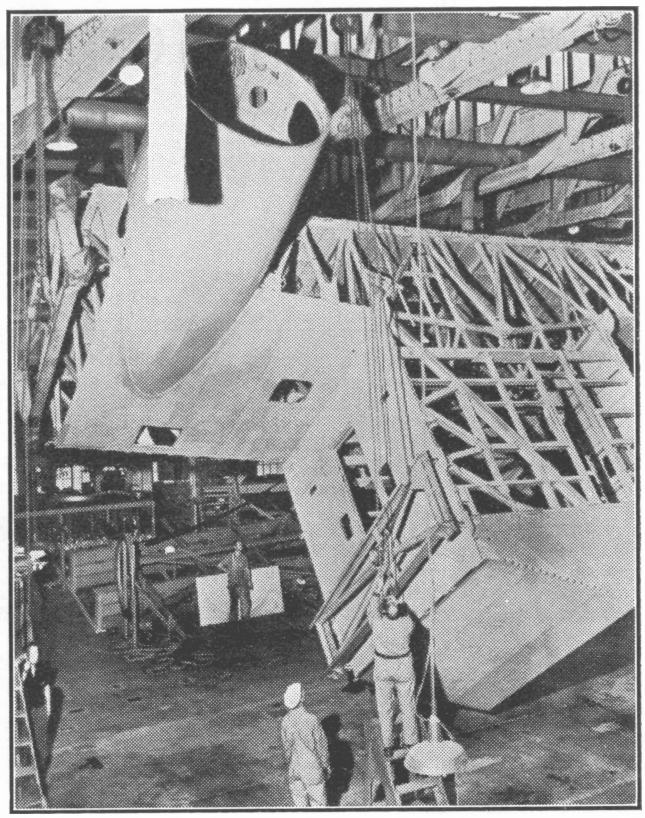
Throughout the year contacts with Europe were regularly maintained, in spite of the German over-running of the Continent. On the Lisbon service recently 400 passengers were carried in a month, as well as much mail and freight. On these flights it is not uncommon for the passengers to be of five different nationalities, and recently eight countries—Great Britain, Poland, Norway, Belgium, France, Japan, Hungary, and Luxemburg—were represented in one aircraft.

Last year passengers were flown across the Atlantic in British flying boats for the first time. An account of this transatlantic service was given in last month's *"Air News."*

A new Empire air link has been forged by way of Lisbon to Bathurst on the West coast of Africa, involving a sea crossing of 1,800 miles, roughly equivalent to that of the North Atlantic. When the British Airways flying boats began to take this route it was virtually uncharted, as there were no weather forecasts, radio reports, or the elaborate ground facilities of peace time. Skill and experience in long-distance navigation, and great physical endurance, were required of the crews.

Beyond Bathurst there is another long hop, from Freetown to Lagos, more than 1,200 miles, before connection is made with the landplane services which traverse Africa. These landplane flights from the West Coast of Africa to Cairo in the east, a distance of 3,500 miles, are across the heart of the continent, and night stops are made at places like Kano and El Fasher, where caravans have met for a thousand years. In the Near East the landplanes again connect with the flying boats, this time on the Empire route, from Durban to Sydney and Auckland by way of India and Singapore.

In close co-operation with British Airways, Dutch landplanes of the K.L.M. fleet are supplementing our flying boats which go to Lisbon, and in Africa, S.A.B.E.N.A., the Belgian national air company, is flying between the West Coast and Egypt by way of the Belgian Congo.



The huge wing centre section of a Boeing super-"Clipper" flying boat is built upside down for ease of assembly. Here the section is seen being righted in the course of moving it into the main hull jig. Photograph by courtesy of the Boeing Aircraft Company, U.S.A.

A Luton "Major" two-seater monoplane. The wings can be folded back, enabling the machine to be stowed in a small hangar. Photograph by courtesy of "Flight."

Wind Tunnel for Lockheed Aircraft Research

Research now plays a big part in the designing of aircraft, and extensive use is made of wind tunnels in which scale models of the proposed new machines are tested. A large wind tunnel of reinforced concrete is being built for the Lockheed interests in the United States. It will have a test section 12 ft. × 8 ft., and the largest section of the tunnel will measure 20 ft. × 30 ft. A six-bladed airscrew driven by a 1,500 h.p. motor will force the wind through the tunnel at speeds of up to 260 m.p.h.

When the wind tunnel was being planned a scale model of it, one-eighth full size, was constructed, and having served as a guide to the designers, it will now come in useful for small scale test work. The airscrew of this tunnel is driven by a 40 h.p. motor.

BOOKS TO READ

Here we review books of interest and of use to readers of the "M.M." With the exception of those issued by the Scientific and Children's Book Clubs, which are available only to members, we can supply copies of these books to readers who cannot obtain them through the usual channels. Order from Book Dept., Meccano Limited, Binns Road, Liverpool 13, adding 1/– for postage to the price. Postage on different books varies, but any balance remaining will be refunded.

"Dive Bomber"

By Robert A. Winston (Harrap. 3/6 net)

This book is the first complete account of the training of an air pilot of the United States Navy. It is written by one of the first young men to leave civilian life to undergo the intensive training of a naval aviation cadet, and his racy account of his experiences reflects his enthusiasm for the life he chose.

After the initial training, from which the author emerges as an Aviation Cadet in the United States Naval Reserve, he is sent to the Navy's Training School at Pensacola. There he goes through a comprehensive course that includes tuition in landplanes, seaplanes, aerial navigation, radio work, gunnery, formation flying, night flights and bombing. He has many an anxious moment, but his adventurous spirit and his eagerness to learn carry him through to success. Then comes active duty with the United States Pacific Fleet, bringing with it squadron manœuvres and aircraft carrier landings. Training in cross-country flying in new, super-powered aircraft follows, and finally he returns to the Pensacola Training School, this time as an instructor.

All this is graphically described, and there are many thrills and much excitement by the way. For instance, we read in one section of Navy and Army pilots who force each other down in dog fights in which only gunfire is lacking, and in another of aerobatics in formation with the author almost blinded by oil splashed all over his windscreen. Many neat line drawings add to the interest of this excellent book, which will be enjoyed by all interested in flying training.

"The Singing Tree"

By Kate Seredy (Harrap. 7/6 net)

The Singing Tree is an apple tree alive with birds that one day at dawn put life into men of the Austrio-Hungarian army after a night of destruction. The story to which it gives the title is one of life on the Hungarian Plains, full of colour and fun in peace time, with the village folk enjoying their festivals and weddings, growing crops and rearing horses and cattle. Then comes the Great War, when only old men and women and children are left and the Nagy ranch is entrusted for two years to Jancsi, the son of its master. In all the troubles that follow the boy holds the little world of the farm together, with the help of his mother and finally of six stalwart Russian prisoners sent out to do farm work. How this is done is beautifully told, as are the stories of others in the village, some of whom never return to greet the dawn of happier days after the War. The master of the ranch is one of those who come back, however. It is he who tells the story of the singing tree and applies it to the new life.

The book is illustrated by 31 whole page drawings by the author.

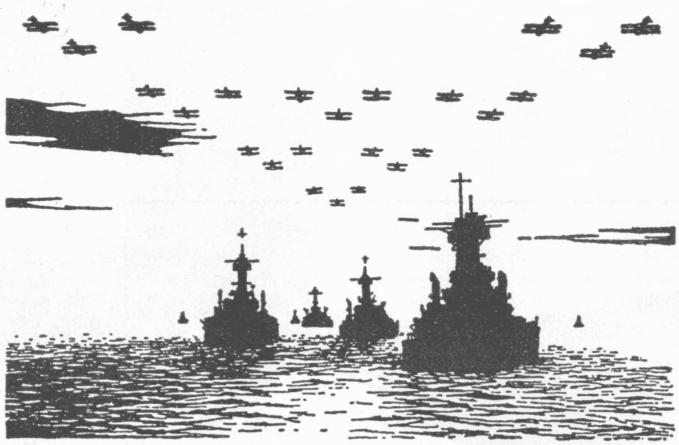
"Deeds that Held the Empire by Air"

By Air Commodore L. E. O. Charlton (Murray. 7/6 net)

This interesting history of aviation differs from the general run of such books by paying special attention to the part flying has played in bringing the British Empire closer together. The author, who qualified as an air pilot as long ago as 1912, begins with a brief survey of the early history of flying, and quickly brings his story up to the outbreak of the war of 1914-18. Then in a series of thrilling chapters he describes some of the outstanding achievements of the R.F.C. and R.A.F. during those four years of hard fighting on many fronts. We accompany the first R.F.C. squadrons on their dramatic flight across the English Channel, and read how Flight Sub.-Lieut. R. A. J. Warneford, flying a Morane machine, made history by destroying a Zeppelin airship in the air. We are also told of the important part played by the R.N.A.S. in the grim story of Gallipoli and learn how the R.A.F. helped General Allenby in his victorious Palestine campaign.

Outstanding achievements in British aviation during the 21 peaceful years that followed are then vividly described, after which we come to the exploits of the R.A.F. during the first nine months of this conflict. The events recorded in these closing chapters are among the most fascinating in the book, and they give us a splendid picture of the difficulties and dangers overcome by R.A.F. pilots.

The book is splendidly illustrated with many half-tone photographs.



One of the fine illustrations from "Dive Bomber," reviewed on this page.

"Rags and Tatters"

By B. J. Mahony (Stockwell. 7/6 net)

In spite of its curious name this is a school story, in which we have the usual rivalries between forms and sides, with plenty of sport, wild nights in the dormitories and a dash or two of bullying thrown in. One gets the impression at times that the boys of Craigsborough College are gangsters, with little thought for anything beyond fights and rough-houses among themselves. The climax comes with riotous scenes following the races at a neighbouring course, which many of the boys attend in spite of prohibition, and at which a feud breaks out between the School and roughs of the neighbouring town. Trouble ensues in the School itself, but in the end the general fighting becomes a thing of the past and all is well again at Craigsborough.

Best Flying Stories

Edited by Norman Macmillan (Faber & Faber Ltd. 8/6 net)

Of books on flying there is no end. Here is one that contains the "cream" of some of the best flying adventures. The 22 stories in it range from an interesting account of the early demonstration flights of the late Anthony Fokker, the famous Dutch aviation pioneer, to descriptions of Zeppelin raids over London in the war of 1914-18 and of thrilling air battles over Dunkirk during the evacuation of the B.E.F. in the present war.

Exciting incidents are related of great flights in all parts of the world by Lindbergh and others, including the author himself, who with a companion made an adventurous pioneer effort that ended in their machine being wrecked in the Bay of Bengal; and dramatic accounts of other ambitious efforts that have ended in mishap are also given.

By way of contrast there is the amusing story of Sam Small, "The Flying Yorkshireman," who made the astonishing discovery that he could fly like a bird, and as a result found himself in many unpleasant situations. In more serious vein is an account by Sir Hiram Maxim of the behaviour of birds in flight, showing what the aeroplane designer can learn from observing them.

The great variety and excellence of the stories in large measure compensate for the absence of illustrations.

"The Seventh Swordsman"

By Gunby Hadath (Lutterworth. 4/– net)

The Seven Swordsmen had fought on the side of freedom in many fierce combats in a South American state. Six of them were South Americans, but the seventh was a mysterious soldier believed to be an Englishman. Peter Franklin, the hero of the story, stumbles across the mystery when he comes to live at "*Falcon Flight*," his uncle's ancestral home, where he finds a naked sword beneath a pile of linen in a box-room. The sword disappears and soon come stirring events, among them an abduction and desperate fights in the house and on the moors. The solution of the mystery is a climax to a thrilling tale of dangerous living that holds the reader from beginning to end.

"Through the Forest of Pines"

By Michael Scott (Harrap. 5/– net)

This delightful book can best be described as a fairy story in which animals play the principal parts. It is dedicated to "*Prince*," a sturdy intelligent Alsatian who guides Boy, his young master, on the journey through the Pine Forest that gives us the tale. Only children who love animals can make their way through this country, and they must also be full of faith and courage. Boy finds allies in the forest animals, who protect him from the evil Dingoes, who finally are overthrown.

ENGINEERING NEWS

A Large Break Lathe

The lathe shown in our lower illustration, built by Tangyes Ltd., Birmingham, is designed to take very heavy cuts with heavy overhung loads carried directly on the faceplate. Power is provided by a constant speed 24-h.p. motor mounted on slide rails at the back of the base plate, and the headstock and faceplate are of very massive construction.

The spindle of the fast headstock carries a faceplate fitted with four hardened steel jaws, and runs in bronze bearings. It can be rotated at 16 different speeds, any one of which can be selected by moving levers conveniently placed in front of the headstock. A tachometer gives the correct speed of the spindle.

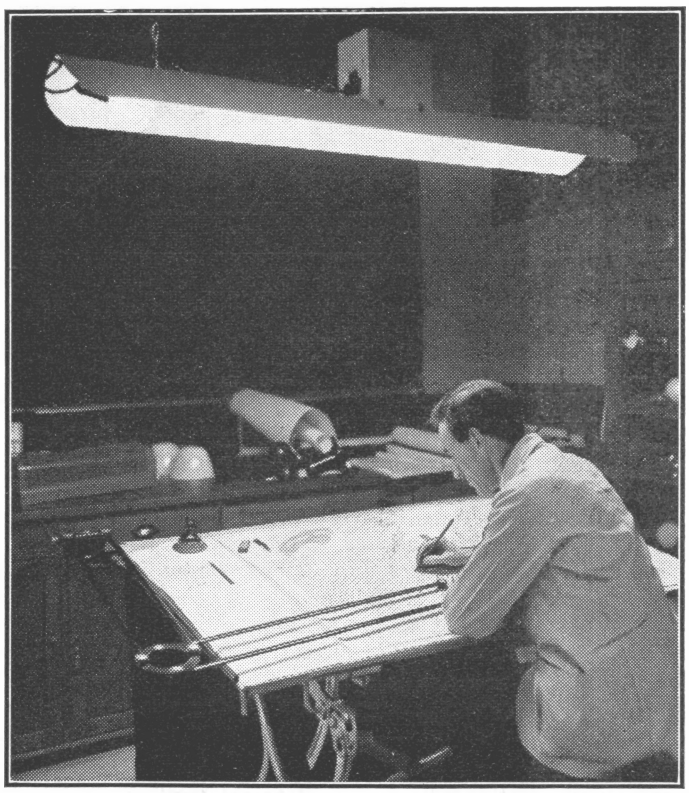
The lathe is fitted with a sliding bed that can be moved to and from the faceplate to allow work of large diameter to be turned. This movement is carried out by a separate motor. The headstock and the sliding bed are mounted on a common baseplate, around which is a trough for holding cooling liquid, which is fed to the tool by a pump. The tool saddle has sliding, surfacing and screwcutting motions, and there is also a separate incutting slide that provides a special quick withdraw motion.

A New Mazda Lamp

The British Thomson-Houston Company have produced an interesting new Mazda fluorescent lamp that gives light of daylight quality. Coloured objects when seen in the new light retain all their vividness and their outdoor appearance. The lamp consists of a slender glass tube 5 ft. long, and the light is produced by the action of invisible rays on fluorescent powder coated on the inside of the tube. The powder has the effect of converting the invisible energy into visible light.

The light from the lamp is very similar to north sky daylight, and as it is perfectly diffused, shadow is practically eliminated. The lamp therefore is ideal for industrial lighting in factories and workshops and for shop window illumination. It is suitable also for offices and art galleries, and the upper illustration on this page shows a lamp of this type illuminating a draughting table in an engineering drawing office. Owing to its length, the lamp can be placed behind the draughtsman, while illuminating his board without shadow.

The lamp is claimed to be three times as efficient as an ordinary gas-filled lamp, and five times as efficient as a daylight gas-filled lamp.



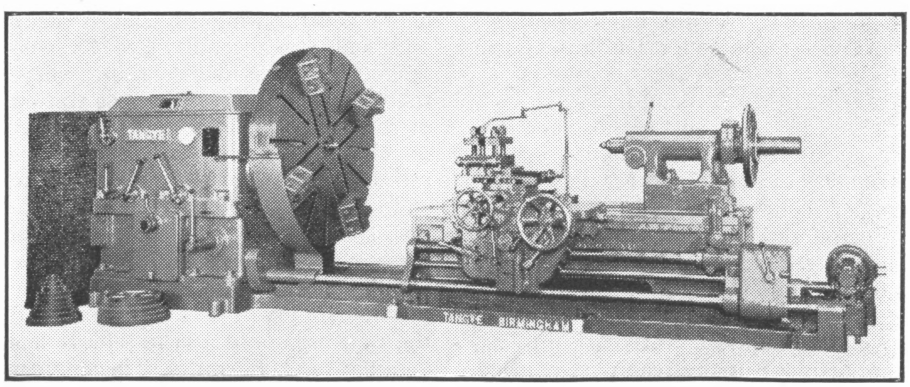
The new Mazda fluorescent lamp illuminating a draughting board in a drawing office. Photograph by courtesy of The British Thomson-Houston Company Ltd.

A Giant Naval Dock

Dredgers are busy at work in the Delaware River at Philadelphia, on the site of a great new dock that is being built there for the United States Navy. It is estimated that the dock will be able to accommodate battleships of up to 60,000 tons if necessary. It will be ready for service about June this year, and will be used immediately in the construction of a 45,000 ton warship. A feature of the new dock will be that instead of the vessels having to be launched at a steep angle, all that will be necessary to float them will be to flood the dock as one fills a bathtub.

A New American Dam Completed

The Hansen dam, which has been constructed as part of a flood control system in California, is now in service. It is constructed from rolled earth to the shape of a horse-shoe, and has a length of 3,500 yds. and a maximum height of 122 ft. At the base it is 1,139 ft. thick, and a total of 14,000,000 cub. yds. of earth was used in its construction. The purpose of the dam is to regulate the flow of Big and Little Tujunga Washes, the flow from which was one of the principal causes of disaster in a great flood that occurred in March 1938.



The large break lathe described on this page. It was built by Tangyes Ltd., Birmingham, to whom we are indebted for our illustration.

American Shipyards Busy on Naval Construction

The great expansion now taking place in the American navy is keeping the Pacific coast shipyards very busy. At the Bethlehem Steel Company's plant at San Francisco two destroyers have already been constructed out of 20 similar vessels and four cruisers assigned to this yard. Another 20 destroyers are to be built at Puget Sound by the Seattle-Tacoma Shipbuilding Company, while six more ships of this kind are being constructed at San Pedro. A naval repair ship is under construction by the Los Angeles Shipbuilding and Dry Dock Company.

The Cunliffe-Owen "Flying Wing"

An Air Liner Without a Fuselage

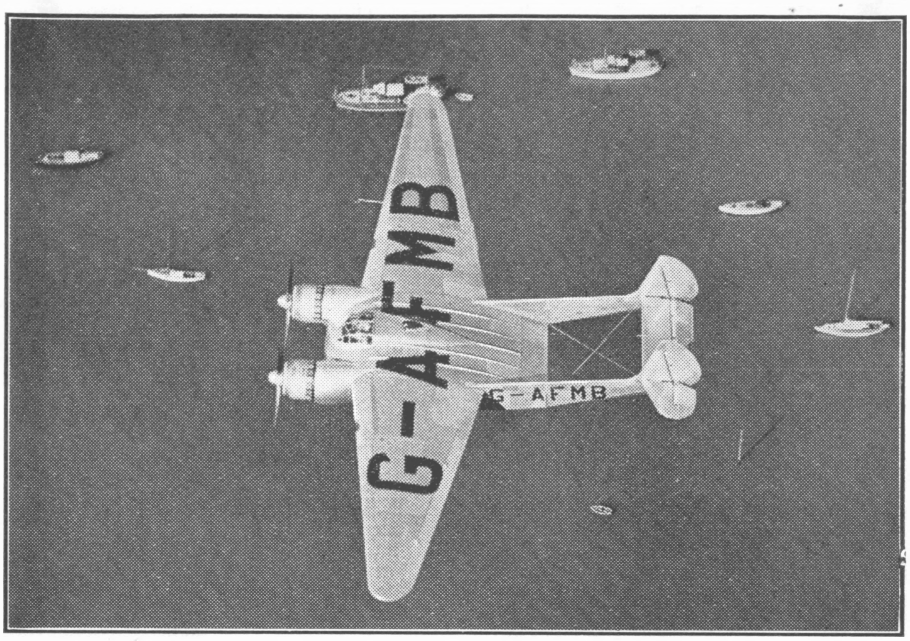
MOST of the new types of aircraft that are introduced are monoplanes or biplanes of orthodox design, but from time to time unusual types appear.

An example of this was the series of Burnelli aircraft produced in the United States between 1920 and 1936. The last of these experimental machines was the Burnelli UB-14B twin-engined transport. Instead of the familiar long fuselage it had a deep and wide wing centre section large enough to accommodate two pilots and 14 passengers. The tail unit was carried on the ends of two parallel, upward curving booms that projected behind this centre section. The machine was a high wing monoplane with retractable undercarriage and tail wheel, and its twin engines gave it a top speed of about 220 m.p.h.

Late in 1937 the Burnelli UB-14B was brought to England for demonstration, and eventually was acquired by Cunliffe-Owen Aircraft Ltd., a new British company, for research on this type of aeroplane. The outcome of their experimental work was the introduction a year later of the "Flying Wing," Mark I, air liner illustrated on this page. This metal-built machine is not a production version of the Burnelli aircraft, although similar to it in appearance, but is an entirely new design.

It is claimed for this type of aircraft that it effects great saving in weight, and as much as a quarter of the total, or all-up weight of the "Flying Wing" is lifted by the big central wing. The absence of a long slender fuselage and the resulting central position of the tail wheel avoid heavy bending loads on the structure of the machine. The lightness of the "Flying Wing" in relation to the payload enables it to carry its own weight in load, and therefore it is economical in service.

The deep central wing that serves the purpose of the usual fuselage is 12 ft. 6 in. wide, and the passenger cabin in it is luxuriously furnished for 15 persons, with the armchairs arranged in three rows. In the side walls, under the wings, are large windows low enough to give the passengers a good view outward even from the centre seats. A door in each of these walls provides access to the cabin, and a bulkhead wall at the back separates the cabin from the luggage compartment. Between the two pairs of seats that form the front row is the entrance to the pilots' cockpit, which has side-by-side seating for two pilots.



The "Flying Wing," Mark I, twin-engined air liner, which has a wide and deep central wing instead of the customary long slender fuselage. Photograph by courtesy of Cunliffe-Owen Aircraft Ltd.

The "Flying Wing" is a high wing monoplane of 73 ft. span, and the tapered outer wings are attached to the upper part of the central wing by pin-joint fittings at the top and inclined struts below. Long, tapered ailerons and split flaps are fitted to the trailing edges of the outer wings. An independently operated split flap is fitted to the underside of the central wing, close to its trailing edge, and it gives valuable aid in steepening the angle of glide for landing upon small aerodromes which have high obstacles at their boundaries.

The pair of long tapering booms are secured to the trailing edge corners of the central wing and project behind it. They carry the tailplane and twin fins and rudders. The undercarriage is retractable into special compartments in the engine nacelles. The tail wheel also is drawn up during flight, in this case into a compartment in the rear part of the central wing. The retraction is operated hydraulically, but in the event of this system failing, access can be gained to any of the wheels while the machine is in the air. There is also a pneumatic system for lowering the landing gear in case of emergency—such as hydraulic failure.

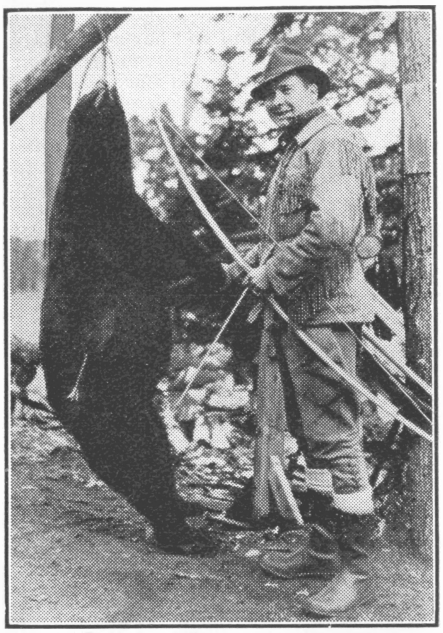
The construction and flight testing of the "Flying Wing," Mark I, gave the Cunliffe-Owen company much valuable experience of this type of aircraft, and all the good points of the machine were incorporated in the design of its successor, the Mark II, and unsatisfactory features eliminated. The design of this later "Flying Wing" was completed about the time that the war began, but a photograph of it is not available. It is very similar to the prototype, but has a central wing sufficiently deep and wide to accommodate 18 passengers in the main cabin, where there is also a radio operator's station at the entry to the pilots' cockpit. A novel feature is the provision of two retractable tail wheels, one at the end of each tail boom, instead of one under the trailing edge of the central wing. "Bristol" type engines are fitted, and the top speed of the machine is given as 225 m.p.h. and the cruising speed 185 m.p.h. It has a range of 2,000 miles. The engines are carried on the leading edge corners of the central wing.

From Our Readers

This page is reserved for articles from our readers. Contributions not exceeding 500 words in length are invited on any subject of which the writer has special knowledge or experience. These should be written neatly on one side of the paper only, and should be accompanied if possible by original photographs for use as illustrations. Articles published will be paid for. Statements in articles submitted are accepted as being sent in good faith, but the Editor takes no responsibility for their accuracy.

Hunting with Bow and Arrow

Jack Langdon of Ontario, Canada, has been an archery enthusiast for years. He had always wanted to try his skill at big game, so after a band of marauding bears



A marauding bear shot by a modern archer. Photograph by S. M. Thomas, Bournemouth.

had wrecked the cook-house of a road constructional camp he applied for permission to shoot them. This was granted. Arming himself with a 6-ft. bow that had a pull of 80 lb., and a quiver of 28-in. steel-tipped arrows, he set forth. At dusk he came upon the bears. Creeping to within 20 yds. range he took careful aim, and with a whizz the arrow sped with the force of a bullet, killing one of them instantly. The animal weighed 400 lb., and its size is well shown in the accompanying photograph.

As a result of his enterprise visitors can now admire a new black bearskin hearth rug at Mr. Langdon's home.

S. M. Thomas (Bournemouth).

Low Water Records at Friar's Crag

Few of the many thousands of visitors to Friar's Crag, Lake Derwentwater, have seen the low water records that are let into the rocks at this popular point. The records are cement blocks laid when the lake reaches an abnormally low level. Each block has marked on it the year in which the level it indicates was reached, with the initials of the observer who recorded it. At the time of my visit the lake was at its lowest level since 1850.

Unusually high levels of the lake also are marked. Unfortunately these records are in grounds not usually open to the public. They are inscribed on a metal strip fastened to a boathouse door.

F. M. Penn (Cheadle Hulme).

A Call at Grand Canary

Travelling on the England to Cape route in one of the Castle boats I had the very good fortune to visit Las Palmas, the well-known port on Grand Canary, the largest of the Canary Islands. I shall always remember the wonderful sight that greeted me on reaching there early one morning. Impressive mountains seemed to come "out of the blue," rising almost sheer from the sea in some parts. One unique lava rock formation that I noticed, as we ran down the coast to the port, was dome-shaped, and presented the appearance of a huge sea monster glistening silver in the morning sun.

As we entered the harbour, which is really a basin walled in with breakwaters, we were almost immediately surrounded by small craft, some loaded with local produce and others with silken and lace goods. A few carried coin divers, who aroused much interest by their skill in retrieving coins dropped overboard by passengers.

With a few friends I went ashore and drove around the town in a buggy drawn by a donkey. For some distance we wound our way along the water front, with residential buildings on the hill-side to the right and the docks on our left. Eventually we entered the town itself, and our buggy stopped first at a small tobacco factory, where we saw cigarettes and cigars made and were presented with a handful of each.

The market square was the next place of interest we visited, and then we continued our journey through the narrow streets until we came to the cathedral, the city's most imposing building. A lift carried us to the top of one of the towers, from which we obtained a wonderful panoramic view. From the cathedral we made our way to the Plaza, with its shady boulevards extending around three of its four sides. The fourth side is the site of the Town Hall.

On we jogged, up the small hill at the rear of the town to the residential quarter, with its weird fusion of modern and Moorish architecture and brilliant colour schemes. Some of the buildings are most picturesque, and all around were tropical gardens and scattered date palms. Then our journey took us back to the waterfront, and one thing I noticed on our way was the use of camels for transport of sand evidently for building purposes. It was a most interesting and instructive excursion.

J. S. Hoal (East London, South Africa).

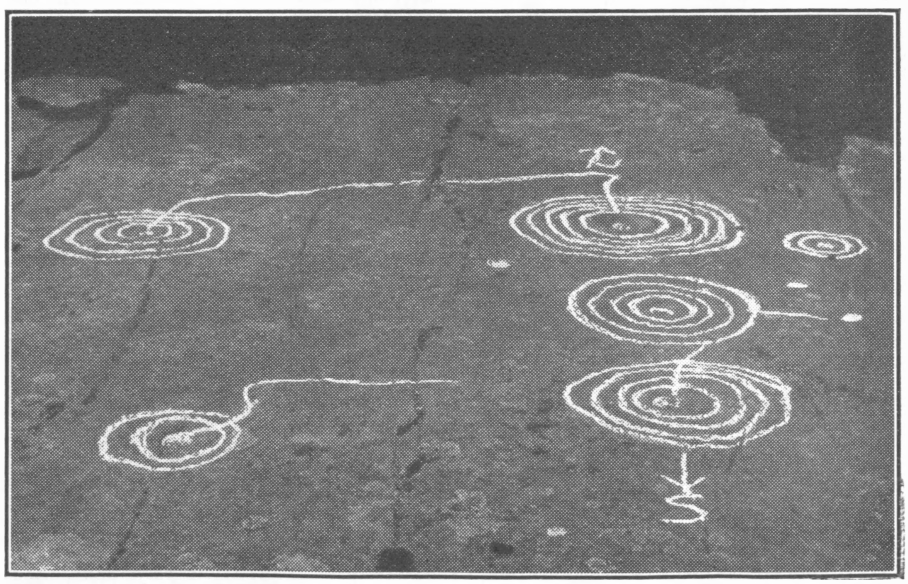
Maps Carved on Rocks

Some time ago I spent a most interesting day transcribing a few of the "rock maps" that are to be found on the hills above Wooler, Northumberland. This is a sport which I can heartily recommend. The maps were inscribed with some primitive tool by the ancient Britons who built their villages or camps on these heights. The horizontal surface of a flat rock was generally chosen for such a map, and if the lines are emphasised with white chalk, as they were when my photograph was taken, it is comparatively easy even to-day to "read" and follow the directions they give. Concentric circles indicate camps, the number of rings corresponding to the number of earthen ramparts enclosing the camp, and the lines mark the directions of moorland tracks and once-important lines of communication.

The maps of course are not drawn to scale, but the directions given are invariably found to be correct. For example, one map on Westwood Moor, shown in the accompanying photograph, indicated the positions of several camps, the remains of which were readily identified without moving many yards from the spot. One camp was outside the immediate range of vision, beyond a rise in the ground. I made off in the direction of this camp, as indicated by the rock map, however, and after mounting the ridge found it easily without deviating from the given course.

The detective faculty is called into play when some of the maps are sought. A number of the tracks are still in use; others prove to be hidden beneath the bracken and heather.

G. B. Wood (Leeds).



A map carved by ancient Britons on a flat rock in Northumberland. It shows the positions of camps or villages, and of moorland tracks between them. Photograph by G. B. Wood, Leeds.

RAILWAY NEWS

Locomotive News

L.N.E.R. No. 417, one of the "V1" class three-cylinder tank engines of the 2–6–2 passenger type, has been rebuilt. She has been given a new boiler working to a pressure of 200 lb. per sq. in. instead of 180 lb. per sq. in., thus bringing her into class "V3" similar to the new 390 series.

Several new 2–8–0 engines of a modified Stanier design numbered in the 8,200s have been seen at work on the L.M.S. and G.W.R. systems. Interesting examples continue to be noted of unusual classes of engines working freight trains and of locomotives operating far from their home stations, sometimes on loan to another company or running on unaccustomed sections of a "foreign" line.

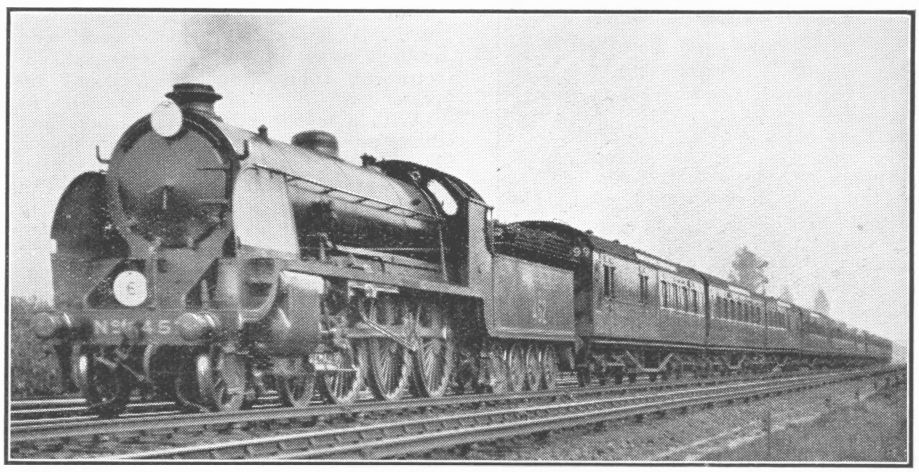
A Railway "Stink Bomb"

Most of us probably have heard of the "sprinkler valve," which can be fitted to come into action in case of fire or other untoward rise of temperature in large buildings or factories. Something similar, incorporating what has vulgarly been called a "stink bomb," is inserted in the transverse hole that runs through the middle of the centre large-end crank pin on the driving axle of the big modern L.N.E.R. express engines. In the event of overheating, a powerful scent of violets is emitted, thus giving the driver the earliest possible warning of any heating trouble in the middle big end. This ingenious device has prevented much serious damage and loss of time spent in repairs, and although its warning odour may cause a sudden unexpected stop and an apparent "locomotive failure," it is a valuable measure of precaution.

The Van Railway

This name does not, as might appear, indicate the type of rolling stock mainly run over the line concerned, but is that of a little branch in Montgomeryshire which, after a chequered career, is soon to be closed. It is about seven miles long, and connects at Caersws with the main route of the former Cambrian Railway, now part of the G.W.R., whence it served six intermediate halts or sidings on the way to the once-famous Van lead and silver mines. The line was opened in 1871 under private ownership for mineral traffic, and two years later for passengers, but was closed in 1893 owing to financial difficulties, after having for some time carried freight only. In 1896 the Cambrian Company leased and reopened the branch for mineral traffic, and it thus came into the possession of the G.W.R. when grouping took place in 1923.

Two Manning Wardle 0–6–0 saddle tanks built between 1872 and 1877 worked the line for many years, as did a later 0–4–0 outside cylinder locomotive by the same makers in 1901. A much older engine than the original pair had been employed on the Van Railway when traffic offered in the last years, however. This was the small 0–6–0 saddle tank, built as long ago as 1864 by Manning Wardle and Co. Ltd. for the Mawddwy Railway, another private system in Wales. This has 3 ft. 1 in. coupled wheels, and cylinders with a diameter of 12 in. and a stroke of 17 in. As G.W.R. No. 824, at the age of 76 she is listed for breaking up. So one more interesting little railway byway passes into history.



The S.R. "Atlantic Coast Express" hauled by No. 452 "Sir Meliagrance," one of the "King Arthur" class.

Railway Emergency Cranes

Powerful travelling steam cranes for use in connection with engineering work, derailments and so on are always in readiness at the principal British locomotive depots. These are distributed so that all lines within a given area can be covered promptly. The four main line companies have recently agreed upon a standard crane for emergency purposes, and 12 complete new units have been placed in service for the L.N.E.R., G.W.R. and S.R. They will be stationed at key points, and will be available as additional equipment for use on the lines to which they have been allocated, as well as for loan to another company should necessity arise.

The crane is carried on a heavy steel eight-wheeled truck. Flat trolleys of the Stokes bogie type are coupled to each end of the carrying truck to relieve the load when running with the crane horizontal. A match truck running on four wheels supports the jib and provides tool storage, and one or more vans to accommodate the crew, their tackle and rations are added to complete a "breakdown train." The squat boiler, which provides power for operating the crane, is pressed to 120 lb. per sq. in., driving a double-acting single cylinder. Water tanks have a capacity of 600 gal., and 10 cwt. coal can be carried. Electric lighting equipment is fitted.

These new cranes are easily capable of lifting up to 45 tons according to the speed and radius employed. They have a very wide circling range, quickly adjusted by change of gear.

Britain's Largest Locomotive Class

News of the construction of further standard Class 4F 0–6–0 freight engines for the L.M.S. reminds us that, with a stud of 770 engines of the class at the time of writing, numbered 3835-4604, this company possesses by far the most numerous British standard type. The design is based on the largest 0–6–0 built by the former Midland Railway and still has a distinctly "Derby" appearance, although well over 500 have been constructed since grouping. The two inside cylinders are 20 in. in diameter with a stroke of 26 in. The engines have 5 ft. 3 in. driving wheels, and the tractive effort is 24,555 lb. In addition to working all kinds of freight traffic over almost the whole system, the engines are frequently seen at the head of passenger trains, particularly of the excursion and special holiday season variety. The straight-sided Belpaire fire-box is a prominent feature, together now with standard L.M.S. fittings.

Help for Railway Travellers

Information booths have been set up in prominent positions at many stations on the Southern and London Passenger Transport Board systems to provide the latest available information as to best routes, train services and other facilities in the London area. Information Officers wearing distinctive armlets are also in attendance during busy hours at the important junction station of Finsbury Park as well as at other points on the L.N.E.R. This is a wartime enterprise, additional to the customary Enquiry Offices at principal stations, loud speaker announcements, and blackboard or poster intimations. Canteens, rest rooms and cloak rooms have been provided at many large British stations for the benefit of Service men and women. Many of these are open night and day, and various philanthropic bodies as well as civilian volunteers are helping to run them.

* * * *

There are 788,000 miles of railway in the world and of this length two-thirds is in the United States.

The L.N.E.R. "J39" Class

In 1926 Sir Nigel Gresley introduced on the L.N.E.R. a new 0–6–0 locomotive of considerable size and power. This was the beginning of the "J39" Class, which is suitable for certain kinds of passenger as well as general goods work, and probably will be the standard design of this type for many years to come. By 1936 205 engines of the class had been built at the company's works, and another 28 were constructed by Beyer, Peacock and Co. Ltd. in 1936-7. During 1937-8 these were followed by 38 more from an L.N.E.R. plant, making 271 locomotives in all, and it is understood that a further 18 are now in hand. They are numbered in various batches between 1233 and 3000, and are found on many parts of the system.

These engines have two cylinders, diameter 20 in. and stroke 26 in., and a boiler pressure of 180 lb. per sq. in. The total evaporative surface is 1,398 sq. ft., with superheater area of 272 sq. ft. and grate area of 26 sq. ft. The driving wheels are 5 ft. 2 in. in diameter. The tender has a capacity of 7½ tons of coal and 4,200 gallons of water, and the total weight in working order is 110 tons.

Brisk Restaurant Car Business

It is reported by the L.N.E.R. that in a recent period of four weeks, 5,824 meals were served in the two *"Flying Scotsman"* expresses between London and Edinburgh. This is an increase of 1,200 on the number served during a similar period shortly before the outbreak of war. The increase has been even more striking on two daily King's Cross-Leeds expresses, and meals served in them now average about 140 a day, in addition to light refreshments.

How L.N.E.R. Locomotives are "Lit Up"

If more than 5 cwt. of coal is necessary to start a fire in an L.N.E.R. express locomotive, what quantity of material is required to light it?

Here are some clues to the puzzle. An engine of the A4 "Pacific" type has a grate area of 41.25 sq. ft. The firelighters used measure 6 in. by 4 in. by 3 in., and consist of four strips of firewood wired together round a central core of compressed shavings and sawdust, impregnated with naphthalene or other inflammable substance. To start the fire 5 cwt. of unlighted coal is shovelled into the fire-box, firelighters are placed on top; and broken coal is heaped on them before they are ignited by means of scrap pieces of cloth soaked in paraffin.

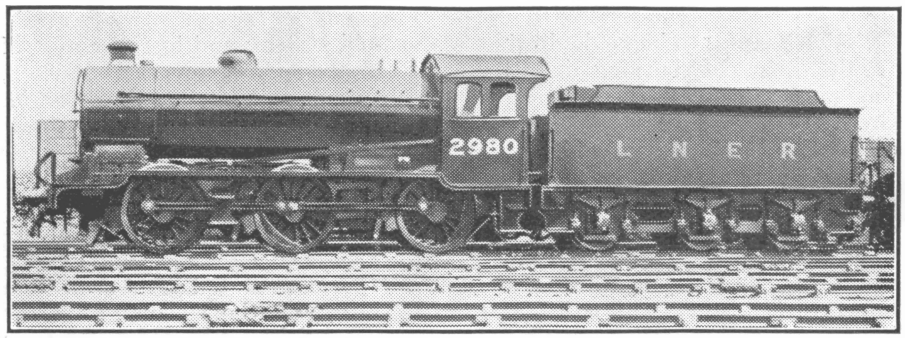
If you have arrived at your answer by comparing the number of sticks used for lighting your home fires you will be wrong, because the answer to the problem is four firelighters!

Several other methods of lighting locomotive fires have been tried in the past, but have been found uneconomical. Live coals used to be drawn from ovens used for drying sand, and another method was to take live coals from the fire-box of an engine in steam.

British Railways purchase annually nearly 15,000,000 tons of coal from British pits for the use of 19,577 locomotives and steamships, hotels, offices, works, etc.

New Railway for Bauxite Traffic

Bauxite is a mineral ore that is required in the production of aluminium, now of great importance and in much demand. Large deposits of good commercial grade ore having been found in a mountainous region about Mlanje in Nyasaland, British Central Africa, steps were at once taken to survey a suitable route for a railway from the region to the nearest existing route and port. It is hoped with modern equipment to create a profitable new industry but, as with all such potential sources of mineral wealth, the railway must be provided first. The existing lines of the country are of 3 ft. 6 in. gauge.



L.N.E.R. standard "J39" class 0-6-0 locomotive, which is suitable for general goods work and for certain types of passenger work. Photograph by W. H. Whitworth.

Electric Snow Melters for Points

The interesting plan of using electric snow melters for keeping railway points working freely during conditions of ice and snow was experimented with during the severe spells of last winter, and doubtless will be employed again.

Electrical snow melters have been employed for some time in Italy, the United States and elsewhere. They take the form of long tubular heaters placed at the sides of the point blades and stock rails, which is a much easier matter with flat-bottomed rails than with the British standard rails employing chairs and keys. The plan adopted at a station high up in the Midlands was to fit five chairs on each rail, that is 10 for each set of points, with cavities underneath containing electric heaters in sheaths of Monel metal, which was used to avoid corrosion. Current in the heaters could be switched on by the signalman when conditions indicated that a blockage might occur through frozen snow. It was found that the points remained in working condition at a time when men had to be called out to free those in similar sections not so equipped.

* * * *

On the average a goods train starts every 5.7 sec. in the United States.

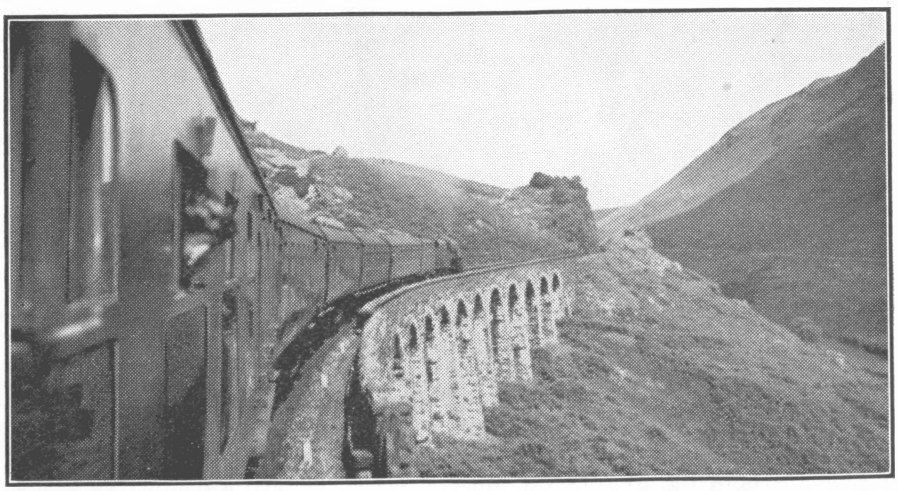
DEVELOPMENTS IN MALAYA

News is to hand of the continued progress of the Government-controlled railways in the Federated Malay States, which form an efficient system of metre gauge lines running from Singapore through Kuala Lumpur to Prai, a distance of 489 miles. At Prai there are ferry launches to convey passengers to Penang. Branches of the railway extend to the Thailand border, permitting a through train to be run twice weekly to Bangkok, the capital of Thailand, Malacca, Port Swettenham and other places. The "scenery" is partly tropical vegetation, tin mines and vast rubber plantations, with wilder mountainous sections. There are many curves and the ruling gradient is about 1 in 100.

The line is nearly all single track, laid with 80-lb. flat-bottomed rails on good ballast, allowing speeds up to 45-50 m.p.h. Electric colour-light signalling is now provided in the Singapore regions; elsewhere British lower-quadrant semaphores are used. The main stations are handsome modern buildings, and native or Anglo-Indian subjects are almost entirely employed on the line, under principal officers from Great Britain.

There are 186 locomotives, built largely by the North British Locomotive Co. Ltd. All the main line engines are of the 4–6–2 type having 4 ft. 6 in. driving wheels, so that they are suitable for goods or passenger trains. The principal classes are "S" and "O" respectively, introduced first in 1936 and 1938. Engines of the "S" class have three cylinders, with a diameter of 17 in. and a stroke of 24 in., a working pressure of 180 lb. per sq. in., and either piston valves with Walschaerts-Gresley gear or rotary-cam gear with poppet valves as standard on the L.N.E.R. "Hunt" class locomotives. Engines of the "0" class, usually found at the head of the principal trains to-day; carry the high working pressure of 250 lb. per sq. in. They too have three cylinders, with poppet valves, and roller bearings to the radial and bogie-tender axles. They are economical, they steam well on poor quality coal, and are capable of long runs with many stops, curves and gradients to cope with on the way. Air-conditioned sleeping and buffet cars are now provided so that loads are substantial.

Modern high-pressure tank engines of class "C," 4–6–4, built in Scotland but assembled and repaired at Kuala Lumpur Works as usual, have been allocated to the Port Swettenham branch, which carries a heavy freight traffic. They have two cylinders of 14½ in. diameter, with a rated tractive effort of 18,200 lb., which is a high figure for an engine of the class on metre gauge.



L.M.S. 5P5F engine at the head of a train climbing Glen Ogle on the Callander and Oban line. Photograph by D. F. Forbes, Edinburgh.

War Industry of the Woodlands

By Sydney Moorhouse, F.R.G.S.

THERE seems to be no doubt that the charcoal burning industry was carried on in the woodlands of Great Britain during the Roman occupation, and it is even believed to have existed at a much earlier date. Certainly there is authentic evidence of charocal burners being at work in the New Forest of Hampshire over 900 years ago. Those who know their history will recall that it was on 2nd August 1100 that a humble charcoal burner named Purkess discovered the body of William II, known as William the Red or Rufus, slain by an arrow sped by an unknown foe and lying under a great oak tree in the heart of the forest. Purkess placed the body in his charcoal-grimed cart and took it into Winchester for burial. The spot where this now historic incident occurred is marked by a monument known as the "Rufus Stone."

It would seem that the descendants of this Purkess plied the same craft for centuries afterwards, for within living memory there have been men of this name engaged in charcoal burning in the vicinity of Canterton, not far away from the Rufus Stone, who claimed him as an ancestor.

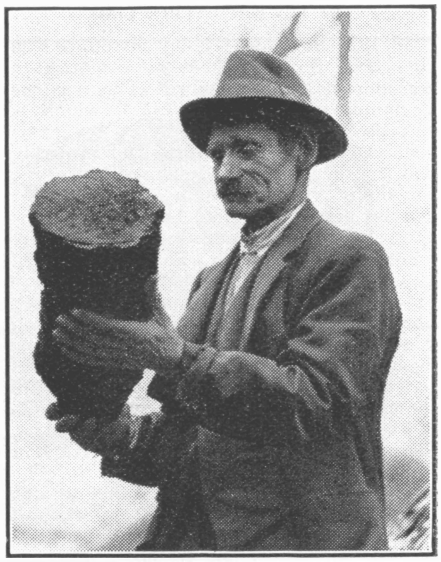
Although what might be termed a modern plant has been installed in certain parts of the New Forest, the majority of burners work to an age-old system; and in the Forest of Dean, the Midhurst district of Sussex, the woodlands of the Lake District and in Shropshire much the same methods are employed as were being used when William the Conqueror arrived in these islands.

About 400 years ago vast quantities of wood charcoal were being used for the purpose of reducing iron from its ores, and the woodlands in the south of England in particular were ravaged in order to provide the fuel for this purpose. Indeed, so great was the denudation that whole forests in Surrey and Sussex disappeared, so that it became necessary to regulate the activities of the charcoal burners and restrict their operations to certain sections of forest and woodland reserved for their purpose.

Every 17th year these portions of woodland are cut down, and the sticks, which are no thicker than an average man's wrist, are cut into uniform lengths and piled on a hearth in a large heap. Some of the mounds thus formed have a height of 3 ft., a diameter varying from 20 ft. to 25 ft. and contain over seven thousand logs.

A charcoal burner covering his pile of logs with earth before setting the mass alight.

The erection of the piles is a highly skilled job, for the logs have to be placed in such a manner as to allow air to circulate round them and to leave spaces through which combustion gases can escape. This accomplished, the heap is covered with turf, heath, gorse or clay and then set alight.



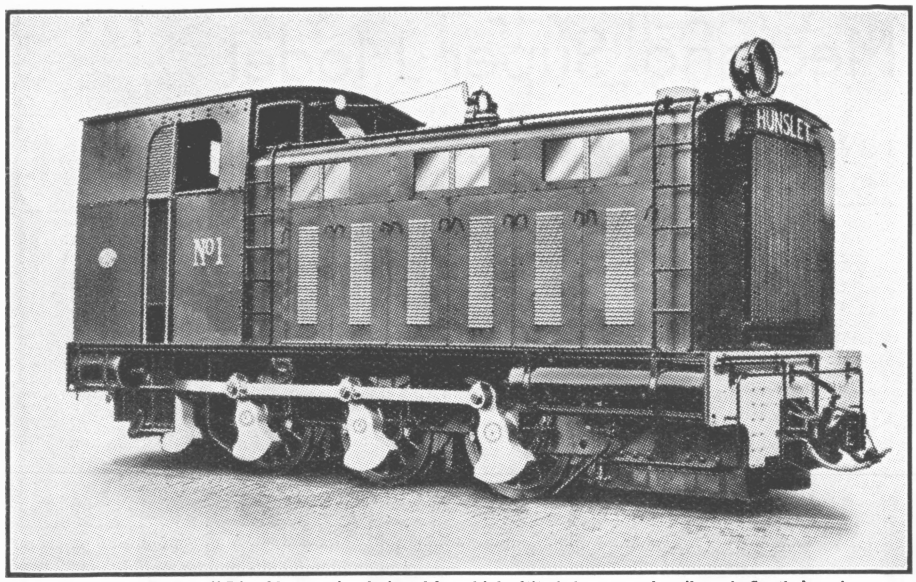
A veteran charcoal burner examining a piece of charcoal in Cobham Woods, Kent.

The wood is allowed to burn for a period varying from two to five days and all the time the men must be in constant attendance. Should a burst of flame make its appearance it is immediately sealed in with a few wet turves or a patch of wet clay, for a few moments' neglect in such a case might result in the whole pile being converted into a huge bonfire. The art of the charcoal burner has been defined as the production of "the maximum amount of charring and the minimum amount of burning."

The burner himself is able to tell whether the process is proceeding satisfactorily or not by watching the smoke as it rises from the pile. At first this is darkish blue in colour, but as charring continues it becomes paler and finally almost colourless.

I have found that charcoal burners are not keen on allowing spectators to get too close to the piles, and little wonder, for one told me of a man pushing his walking-stick into the smouldering wood and doing over £20 worth of damage! Little did the perpetrator of this foolish action realise that he was admitting an overdose of air and so setting fire to the pile.

When the charring is deemed complete, water is poured on the pile and the burning stopped. The burner allows the pile to cool and then removes the turves, exposing to view the charcoal sticks, which ring metallically as he throws them on to a heap.



A 330 h.p. "Hunslet" Diesel locomotive designed for a high altitude heavy grade railway in South America.

Two Special Diesel Locomotives

Mountain Railway and Mine Work

ON this page we illustrate two interesting Diesel-engined locomotives built by The Hunslet Engine Co. Ltd., Leeds. They have been designed specially for the particular conditions under which each has to work, and they incorporate many interesting features.

The locomotive shown in the upper illustration was built for service on the Guaqui-La Paz railway in South America, where it runs over a section of track that for grade and altitude is unequalled anywhere in the world except by rack or funicular railways. Although it is primarily for use at an altitude of 11,500 ft., the locomotive is actually designed to operate satisfactorily from sea level up to a maximum altitude of 16,000 ft. A severe incline of 1 in 7 extends for several miles out of La Paz, and previously only electric locomotives were allowed to run on this stretch of the line, as the gradient is considered too steep for satisfactory steam locomotive working.

The main power unit of the locomotive is a Mirrlees engine normally capable of developing 330 b.h.p. at 900 r.p.m. It is fitted with a variable speed governor and a supercharger capable of increasing the engine output at sea level to 495 b.h.p. The supercharger is designed to work most efficiently at the highest altitude, however, as the maximum power is not required under sea level conditions.

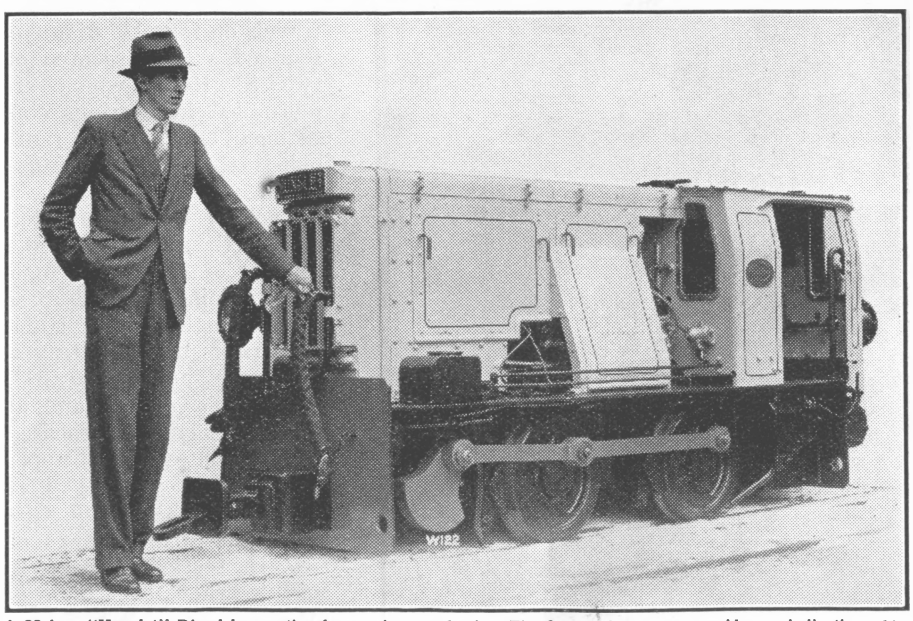
Although La Paz is only 17 deg. south of the Equator, it experiences very low night temperatures due to its altitude. This fact, combined with the rarity of the atmosphere, made the starting up of the main engine one of the chief difficulties that had to be overcome by the designers. Two entirely independent sets of starting equipment therefore have been provided. One of these is an auxiliary Diesel compressor set, which is electrically started and is normally capable of developing 25 b.h.p. at 1,500 r.p.m. It drives a two-stage compressor and is capable of charging two large capacity air reservoirs to a pressure of 500 lb. per sq. in. in 7 minutes. The other main engine starter comprises an electrically started Ford V8 petrol engine of 90 h.p., which operates through a Bendix pinion meshed with a geared ring on the flywheel. The Ford engine is capable of turning the main Diesel engine for any length of time, so that a start is certain even under most difficult conditions. Thus possible delays caused by lack of compressed air for starting are avoided.

Compressed air for the braking systems is provided by dual compressors driven by belts from the main engine. The brake equipment has received special attention in view of the very severe gradients that have to be tackled, and is of the very latest type throughout.

The engine power is transmitted to the driving wheels through a hydraulic coupling and a "Hunslet" patent auxiliary gear-change clutch and a four-speed constant mesh gear-box, giving locomotive speeds of 5, 7½, 11 and 16 m.p.h. The gears are controlled through a "Hunslet" patent pre-selective gear change. A single handwheel not only speeds up the engine but also controls the gears through a series of pneumatic valves, which deliver air at a pressure of 50 lb. per sq. in. to cylinders that operate gears, clutch and clutch shaft brakes, in correct sequence.

Great care has been taken to ensure efficient cooling, for although air temperatures frequently are very low, they vary over a wide range, and as the density of the air is greatly reduced at high altitudes its capacity for carrying away heat is reduced proportionately. These difficulties have been overcome by fitting a radiator of extra large size. This has 12 detachable cooling elements, two of which are devoted to oil cooling, a matter of great importance with a heavily stressed Diesel engine.

The locomotive shown in the lower illustration differs considerably from that just described. Instead of having to work at high altitudes it spends its days in the deep underground workings of a coal mine. It is designed specially for use in gassy coal workings and has been approved by the Mines Department for this purpose. Its special feature is a flame arrester, which prevents flames and sparks from the engine reaching the outside air, which would be extremely dangerous in the presence of gas. The inlet air to the engine first passes through an air cleaner and then through a flame arrester consisting of a series of stainless steel plates arranged face to face like leaves and enclosed in a steel box. On the exhaust side the gases pass first through a non-return valve into a Hunslet patent exhaust gas conditioner, and then through flame arresters into an air-mixing chamber. There they are mixed with 30 to 40 times their volume of fresh air before being exhausted into the ventilating current.



A 23 h.p. "Hunslet" Diesel locomotive for use in a coal mine. The figure of the man provides an indication of its size. The photographs on this page are reproduced by courtesy of The Hunslet Engine Co. Ltd., Leeds.

A New Meccano Super Model

Travelling Gantry Crane

THE fine Meccano travelling gantry crane that is shown in Fig. 1 on this page is a very interesting and instructive model, and will provide owners of large Outfits with a splendid subject for their attention. Cranes of this type are in use all over the country and are applicable for all kinds of work. They are of the greatest value in stockyards, foundries and warehouses, as they require little head room and are capable of dealing with either great or small loads, which may be picked up and deposited over a wide area.

The movements of the model include travelling of the entire crane along its rails and traversing of the crab trolley along the gantry, in addition to the hoisting and lowering of the load. All these movements are operated by an E6 or E20B Electric Motor.

Construction of the model should be commenced by building up the tower bases. Each side of each base consists of channel girders built from two 18½" Angle Girders and Flat Girders, as shown. The sides are joined at each end by 3½" Angle Girders, and the frame so formed is filled in with Flat Plates. Each base

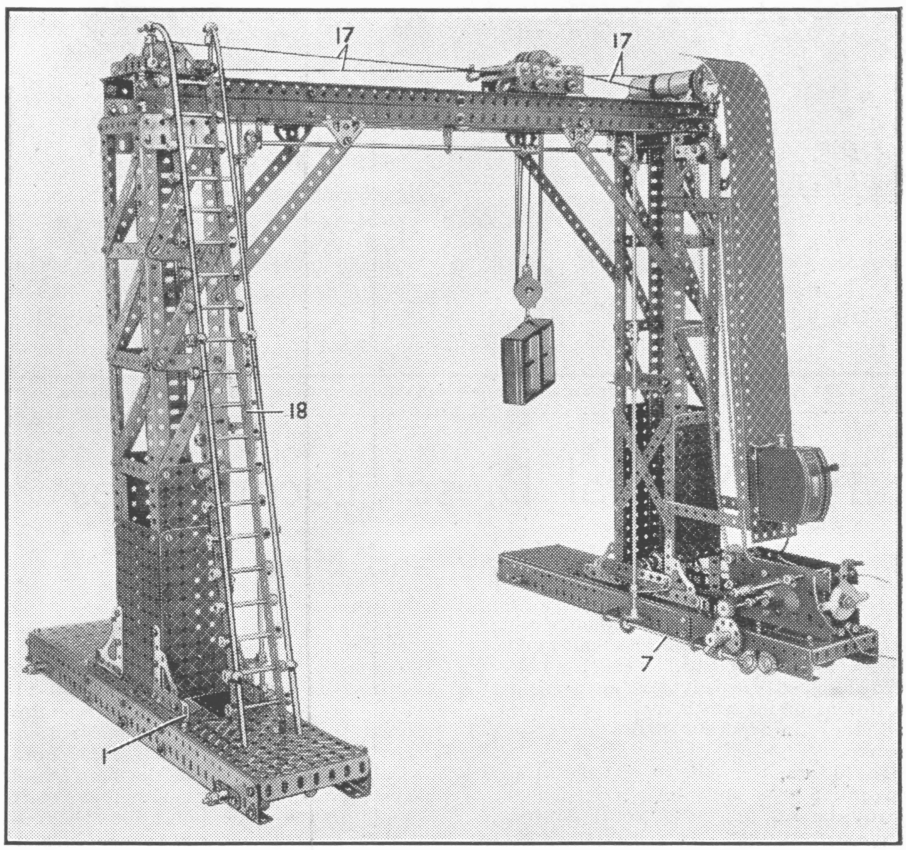


Fig. 1. General view of the new super model Gantry Crane.

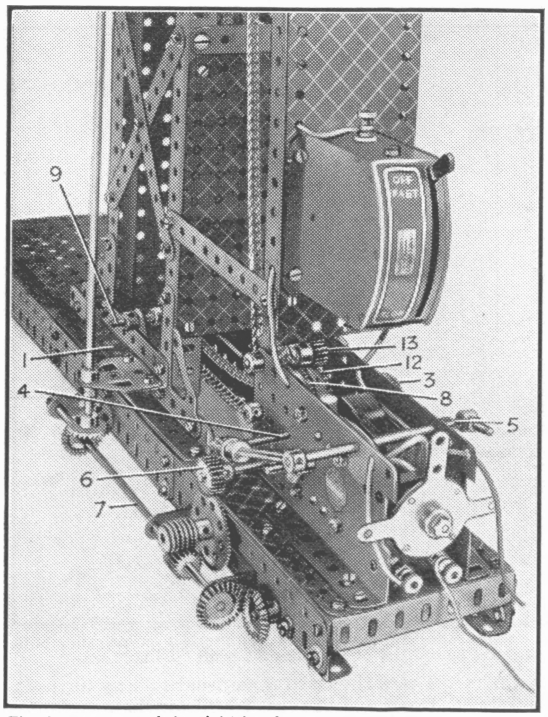


Fig. 2. The base of the right-hand tower, showing the arrangement of the Electric Motor and gear-box.

travels on four 1⅛" diameter Flanged Wheels secured on two 5" Rods, which are journalled in bearings consisting of Double Arm Cranks bolted to the Flat Girders in the positions shown.

Each of the towers that support the main span girder consists of four 18½" Angle Girders joined to the base by 7½" Angle Girders 1 and held rigid by Architraves. They are braced by 3½", 4½" and 5½" Strips, and at their lower ends are encased in Flat Plates. Their upper ends are bolted to 2½" Flat Girders and 3½" Angle Girders. The span consists of two H section girders 2, Fig. 3, each of which is made up of four 24½" Angle Girders bolted to Flat Girders. These are secured to the 3½" Angle Girders at the tops of the towers.

An E20B Electric Motor is bolted to the base of the right-hand tower as shown in Figs. 1, 2 and 4. The arrangement of the gearing is as follows: A ½"×¾" Pinion on the armature shaft of the Motor meshes with a special 57-teeth gear 3, which consists of two 57-teeth Gears fixed back to back on a 4" Rod 4. This Rod forms the layshaft, and it carries a ½" Pinion and is slideable in the Motor side plates. Movement of the layshaft is controlled by a selector 5, consisting of a 3½" Rod that is also free to slide longitudinally in the Motor side plates, as shown in Fig. 2. When the Rod 4 is moved right over to the left, the drive is transmitted to the travelling wheels. The ½" Pinion on the Rod 4 then meshes with a similar Pinion on a 3½" Rod that also carries a ¾" Pinion 6. This Pinion engages a 57-teeth Gear on a 5" Rod. A Worm on the Rod meshes with a ½"×½" Pinion on an 8" Rod 7 that carries two ⅞" Bevel Gears. These Bevels mesh with

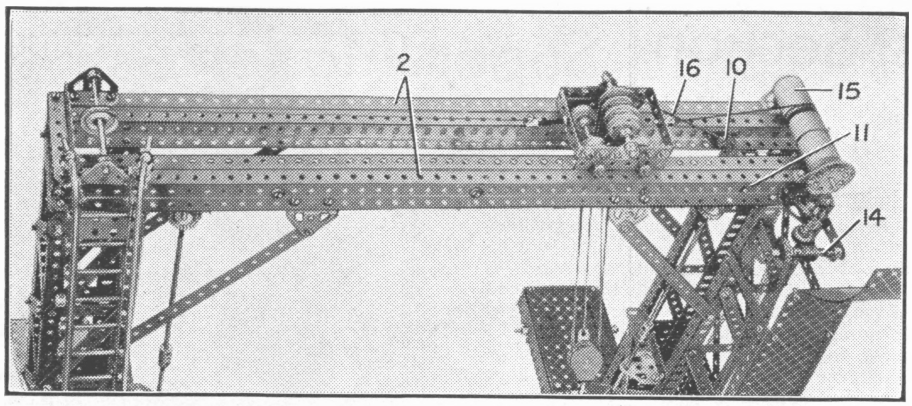


Fig. 3. The gantry seen from above, showing details of the crab trolley.

further $\frac{7}{8}$″ Bevels on the axles of the travelling wheels.

The gear train that transmits the drive for hoisting and lowering the load is brought into operation by placing the selector rod in a central position. The $\frac{1}{2}$″ Pinions are then disengaged and the one on the layshaft meshes with a 57-teeth Gear 8 fixed on a 2″ Rod that also carries a $\frac{3}{4}$″ Sprocket. The Sprocket is connected by Sprocket Chain to a similar Sprocket on a 4″ Rod 9, which is journalled in two Flat Trunnions at the base of the right-hand tower. A 1″ Sprocket on Rod 9 drives a $\frac{3}{4}$″ Sprocket secured to a 4″ Rod journalled at the top of the tower and fitted with a Worm. This Worm meshes with a $\frac{3}{4}$″ Pinion 10 on a 3″ Rod 11.

A third train of gears is provided for transmitting the drive to the travelling crab from which the load hook is suspended. It is brought into operation by sliding the selector rod 5 to the extreme right. A $\frac{1}{2}$″ Pinion on the layshaft then meshes with a 57-teeth Gear 12 loose on the 2″ Rod that carries the Gear 8, and with a $\frac{1}{2}$″ Pinion 13. The Rod of this Pinion carries a 1″ Sprocket that is connected by Chain with a similar Sprocket on a 3″ Rod 14. A Worm on Rod 14 transmits the drive to a Wood Roller 15 through a $\frac{3}{4}$″ Pinion and Bevel Gears as shown in Fig. 3. The speed at which the various operations are carried out is varied as required by means of a Resistance Controller fixed to the right-hand tower and wired in series with the Motor.

The crab, which is seen in Fig. 3, consists of two $2\frac{1}{2}$″ × 1″ Double Angle Strips joined to two 3″ Flat Girders. Two 1″ Triangular Plates bolted to the Flat Girders provide bearings for a $3\frac{1}{2}$″ Rod that carries four loose 1″ Pulleys spaced from each other by Washers. The crab travels on four $\frac{3}{4}$″ Flanged Wheels. A Handrail Support is secured in the centre hole of one of the Double Angle Strips, and a $1\frac{1}{8}$″ Bolt in that of the other. A Threaded Boss is screwed on the Bolt and a 7/32″ Bolt is inserted in one of its tapped bores.

The cord 16 for hoisting and lowering the load is attached by a Cord Anchoring Spring to the 3″ Rod carrying the $\frac{3}{4}$″ Pinion 10, and it is then passed over one of the outer 1″ Pulleys on the crab, and around the sheaves of the Pulley Block and the Pulleys of the crab. Finally it is tied to the lug of the Pulley Block.

The Cord 17 for traversing the crab is fastened at one end to the Handrail Support on the crab and then wound several times around the Wood Roller. The other end of the Cord passes through opposite holes in the Double Angle Strips forming the ends of the crab frame, and then is passed over a 1″ Pulley mounted on a 4″ Rod journalled in two Trunnions at the left-hand end of the span, and tied to the Bolt in the Threaded Boss on the crab. The Threaded Boss provides means of applying the correct tension to the cord, the degree of tension being regulated by screwing the Threaded Boss along the Bolt as required.

A ladder 18 giving access to the span is constructed by attaching two compound strips, each made up from two $12\frac{1}{2}$″ Strips overlapped nine holes, to the tower base and to the upper end of the tower. The middle rung consists of a 2″ Screwed Rod fixed in place by Nuts, and the others are 2″ Rods held by Collars. The handrails are $11\frac{1}{2}$″ Rods joined by Rod Connectors and supported by Handrail Couplings and Handrail Supports, the latter being secured in the tapped bores of the Collars on the rungs.

A guard for the gearing is fixed to the right-hand tower as shown.

Parts required to make new Super Model Gantry Crane: 4 of No. 1; 4 of No. 1b; 4 of No. 2; 20 of No. 2a; 8 of No. 3; 11 of No. 5; 3 of No. 6a; 8 of No. 7; 16 of No. 7a; 2 of No. 8; 4 of No. 8b; 14 of No. 9b; 1 of No. 9f; 3 of No. 12; 5 of No. 12a; 7 of No. 13; 4 of No. 13a; 6 of No. 15; 1 of No. 15a; 4 of No. 15b; 5 of No. 16; 2 of No. 16b; 22 of No. 17; 2 of No. 18b; 8 of No. 20; 4 of No. 20b; 1 of No. 22; 4 of No. 22a; 3 of No. 25; 3 of No. 26; 1 of No. 26a; 1 of No. 26b; 5 of No. 27a; 12 of No. 30; 1 of No. 30a; 1 of No. 30c; 3 of No. 32; 351 of No. 37af; 344 of No. 37bf; 81 of No. 38; 1 of No. 40; 4 of No. 46; 6 of No. 52a; 80 of No. 59; 9 of No. 62b; 3 of No. 63; 1 of No. 64; 4 of No. 70; 3 of No. 72; 2 of No. 77; 2 of No. 81; 2 of No. 94; 3 of No. 96; 3 of No. 96a; 8 of No. 103b; 2 of No. 103e; 3 of No. 103f; 4 of No. 103k; 1 of No. 106; 8 of No. 108; 1 of No. 111d; 1 of No. 115; 1 of No. 116a; 8 of No. 126; 8 of No. 126a; 7 of No. 136; 2 of No. 136a; 1 of No. 139; 1 of No. 139a; 1 of No. 153; 1 of No. 176; 2 of No. 192; 1 of No. 197; 2 of No. 213. 1—E6 or E20B Electric Motor; 1—6-volt or 20-volt Resistance Controller.

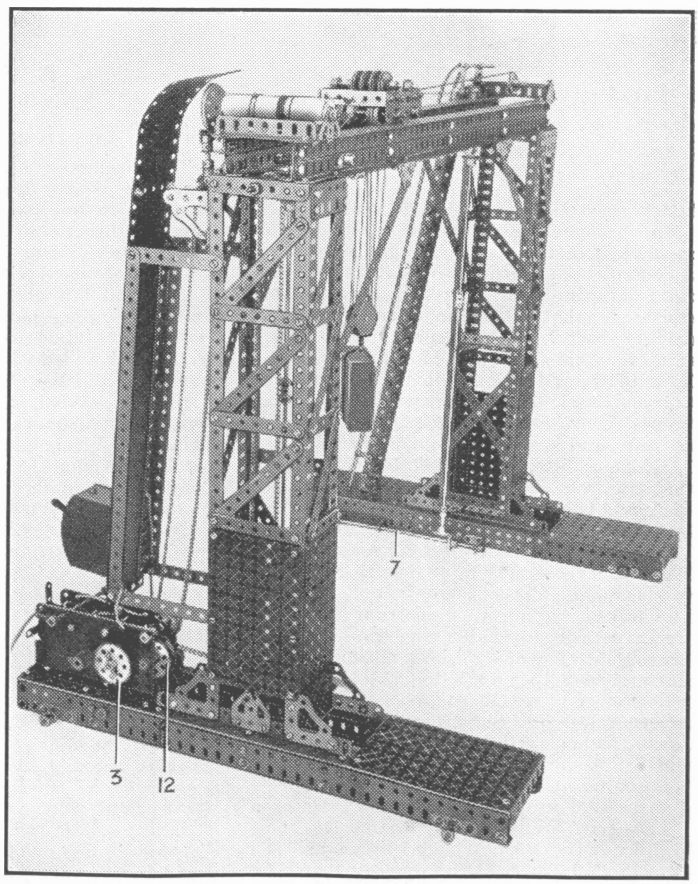


Fig. 4. A rear view of the complete model.

Suggestions Section

By "Spanner"

(495) Automatic Infinitely Variable Speed Gear

The apparatus shown in Fig. 495 is a type of gear-box incorporating what is known as "friction disc" drive transmission. This type of transmission gear depends for its operation upon the friction existing between two discs, one at right angles to the other, and revolving on it. By sliding the driven disc towards or away from the centre of rotation of the other, the speed is decreased or increased. For example, when the driving disc is pressing upon the other at a point near the latter's circumference, it will rotate at maximum speed. If the driven disc is moved towards the centre of the driving disc, the speed of the latter must automatically decrease.

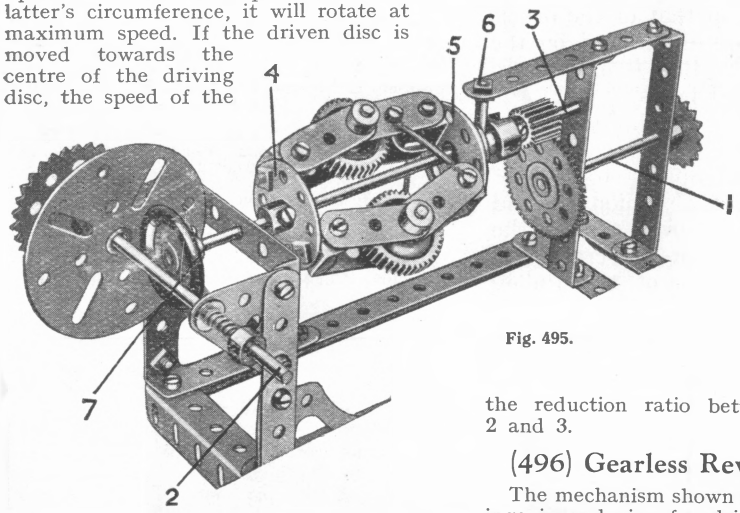


Fig. 495.

In the mechanism shown in Fig. 495 movement of the disc is brought about by a centrifugal governor, so that the speed ratio varies automatically according to the resistance that is to be overcome. The driving shaft 2, which is connected by any suitable means to the Motor, carries a Face Plate, and is journalled freely in two Corner Brackets that form part of the frame. A 6½" Rod 3 is free to slide in its bearings and is fitted with a 1" fast Pulley 7, which is fitted with a 1" Rubber Ring that engages with the surface of the Face Plate and is kept in close contact therewith by a Compression Spring on the Rod 2.

The centrifugal governor consists of two Bush Wheels 4 and 5, to each of which two Double Brackets are bolted rigidly. The links carrying the governor weights are attached pivotally to the Double Brackets by means of lock-nutted bolts, and are passed on to 1½" Rods, on which are mounted the 1" Gears forming the governor weights. Short lengths of Spring Cord attached to the links as shown in the illustration prevent the governor from functioning at too low a speed and return it to normal after operation.

The Bush Wheel 4 is secured to the Rod 3 but the Bush Wheel 5 is free and is connected by a Socket Coupling to a ½" diam. ½" face Pinion. A Threaded Pin 6 engages the groove of the Socket Coupling, and prevents longitudinal movement of the Bush Wheel 5. The Pinion is in constant mesh with a 57-teeth Gear Wheel secured rigidly to the driven shaft 1.

The mechanism operates as follows. When the shaft 1 is running free without any retarding load, the governor weights fly out to their fullest extent owing to centrifugal force developed by the speed of the rotating shaft 3. As the Bush Wheel 5 cannot move longitudinally, wheel 4 must do so, carrying with it the Rod 3. This results in the Pulley 7 being kept near the rim of the Face Plate, and a step-up ratio is obtained.

When a retarding force is applied to the shaft 1 the speed of the Rod 3 diminishes and the governor weights fall inward, thus moving the Rod 3 and pushing the 1" Pulley 7 nearer the centre of the Face Plate. As the resistance on the shaft 1 increases the Pulley moves nearer the centre of the Face Plate, thus compensating for the extra load by increasing automatically the reduction ratio between the shafts 2 and 3.

(496) Gearless Reverse Drive

The mechanism shown in Fig. 496 is an ingenious device for driving two shafts, arranged in line, so that they revolve in opposite directions. An interesting feature of the mechanism is that the reversing action is obtained without the use of gears.

The Rod 1 is driven and bears a Collar and a Coupling mounted on the end of the Rod by its centre transverse hole. The Rod 2 is provided with a Coupling similarly mounted, and both Rods are journalled in Trunnions spaced from the base plate by two Washers on each fixing bolt. The Washers raise the mechanism slightly and prevent it from fouling the base plate.

Two further Trunnions provide bearings for the unit 3, which is formed by fixing two 2" Rods in a Coupling through the centre of which is passed a 1½" Rod. At the ends of this short Rod the forks of Swivel Bearings 4 and 5 are free to slide, and their "spiders" are pivotally attached by means of ¾" Bolts to the Couplings on the Rods 1 and 2. The final drive is taken from a ½" Pinion on the Rod 2. If care is taken to ensure that all the moving parts work freely, the device will give a silent drive with little vibration.

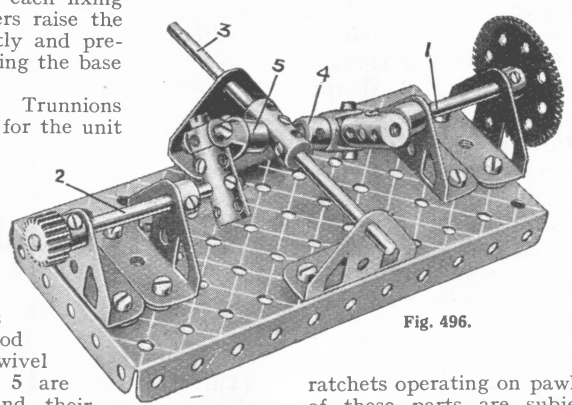


Fig. 496.

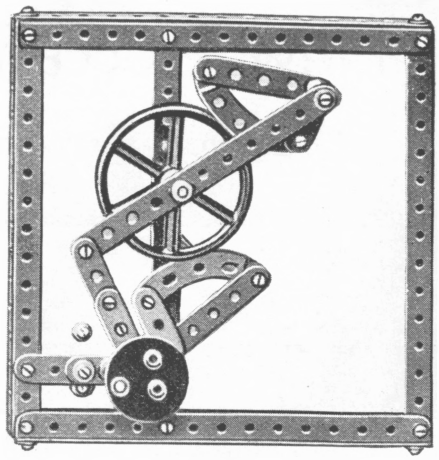


Fig. 497.

(497) Silent Intermittent Rotary Motion

The device illustrated in Fig. 497 has many uses in Meccano models where an intermittent motion is required in some part of the mechanism. It is positive in action and practically silent. A Flywheel is secured on a Rod, at the outer end of which is a Collar that holds a 5½" Strip in position. This Strip is pivoted 2½" from its lower end, and carries at its upper end a cam built from one 2½" Strip, one 1½" Strip and a 2½" small radius Curved Strip. The complete cam is pivotally secured to the Strip by a ¾" Bolt, in such a position as to allow the outer edge of the Curved Strip to engage with the groove cut in the rim of the Flywheel. A short length of Spring Cord is used to hold the cam in position.

The lower end of the 5½" Strip is secured by a lock-nutted Bolt to a 2" Strip bolted to the strap extension of a Triple Throw Eccentric. The latter is mounted on one end of a Rod that is connected up to the source of power.

As the Eccentric turns, the cam on its upward movement jams and carries the Flywheel with it. On the return stroke the cam face is trailing, and does not impart motion to the wheel. To ensure the wheel remaining stationary during the return stroke, a second cam, similar to the first, is fitted. It is attached to the frame of the model by a ¾" Bolt and is held in contact with the wheel by a length of Spring Cord.

There are many applications in model-building for a mechanism of this kind. Usually intermittent motion is obtained by means of ratchets operating on pawls, but the teeth of these parts are subjected to heavy wear and in this respect the mechanism shown in Fig. 497 has a decided advantage, since the amount of wear to which it is subjected is practically negligible. It forms therefore an excellent device for use in cases where a silent intermittent drive is required.

New Meccano Models

Conveyor—Gun—Helve Hammer

CONSTRUCTION of the model conveyor shown in Fig. 3 should be commenced by building the rear end of the boom that supports the conveyor. This consists of two 12½" Strips 1 bolted to the flanges of a 5½"×2½" Flanged Plate so that they overlap 1½" at one end. A Semi-Circular Plate is bolted to the rear end of each 12½" Strip to provide bearings for a 3½" Rod 3, which carries two 1" Pulleys fitted with Rubber Rings. A 5½"×2½" Flexible Plate 4 is attached to the 5½"×2½" Flanged Plate and to the Strips 1 by a

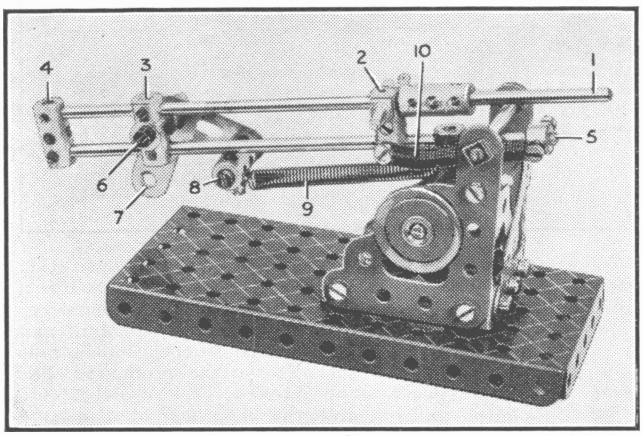


Fig. 2. A Meccano gun that really works. It fires bullets consisting of Couplings.

2½"×½" Double Angle Strip.

The travelling wheels are fixed on a 3½" Rod. The front portion of the boom is hinged and consists of two 12½" Strips 5 lock-nutted to the Strips 1 by Bolts 6. A Magic Motor is bolted to Strips 5 by ½" Reversed Angle Brackets. Two 4½"×2½" and a 5½"×2½" Flexible Plate fill in the boom.

A 3½" Rod 7 is journalled in the outer end holes of the boom, and it carries two 1" Pulleys fitted with Rubber Rings and a 1" Pulley that is connected by Cord to the driving pulley of the "Magic" Motor. The conveyor belt, which is an endless band of paper about 2" wide, is passed over the 1" Pulleys fitted with Rubber Rings and is held in place by idlers formed from 3" Formed Slotted Strips. A 3½" Rod 8, journalled in the 12½" Strips 5 and held by Spring Clips, forms a guide for the lower half of the conveyor belt.

The hinged portion of the boom is raised or lowered by turning the 3½" Crank Handle 9, which operates two lengths of Cord attached to a Cord Anchoring Spring on the Handle and arranged as shown.

The conveyor is tensioned by a 2½" Strip that is joined at each end to a 2½" Strip 10 by ½"×½" Angle Brackets. These Strips are lock-nutted to the Strips 5, and are joined by Cord to a 6" Driving Band 11, which is also attached by a Nut and Bolt to the "Magic" Motor. The conveyor is maintained at the desired angle by a ratchet device constructed from a 2½" Strip 12 bolted to a Double Bracket. One arm of the Double Bracket engages a Spring Clip on the Crank Handle, and its other arm is bolted to a ½"×½" Angle Bracket lock-nutted to the chassis.

Parts required to build model portable conveyor: 4 of No. 1; 4 of No. 2; 8 of No. 5; 1 of No. 11; 8 of No. 12; 4 of No. 16; 1 of No. 19g; 5 of No. 22; 1 of No. 23; 7 of No. 35; 81 of No. 37af; 71 of No. 37bf; 7 of No. 38; 1 of No. 40; 6 of No. 48a; 1 of No. 51; 1 of No. 52; 2 of No. 54a; 1 of No. 90a; 4 of No. 111c; 2 of No. 125; 2 of No. 126a; 4 of No. 155a; 1 of No. 176; 1 of No. 186; 2 of No. 187; 2 of No. 189; 2 of No. 191; 2 of No. 192; 1 of No. 200; 2 of No. 214; 4 of No. 215; 2 of No. 217b; 1 Magic Motor (not included in Outfit).

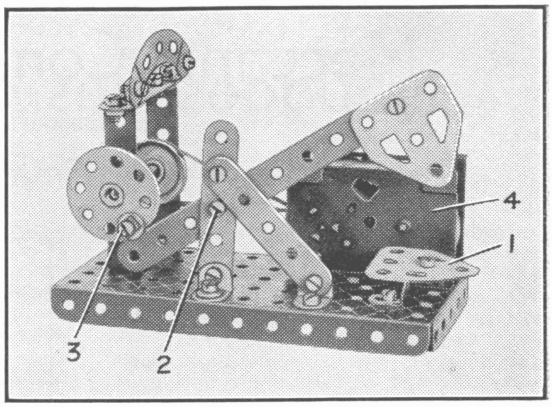


Fig. 1. A simple model helve hammer that can be built from parts in Outfit No. 2.

In Fig. 1 is shown a simple model of a helve hammer that can be built from the contents of Outfit No. 2 The anvil 1 is built up from a Reversed Angle Bracket and a Flat Trunnion. The shaft of the hammer is a 5½" Strip, and the head is a Flat Trunnion. The shaft is pivoted in the fourth hole from its rear end on a Bolt 2, which is pushed through a 2½" Strip fixed by an Angle Bracket to the base, and is made rigid by a further 2½" Strip attached to it and the base, as shown.

The operating mechanism consists of a Bush Wheel fitted with a ⅜" Bolt 3 in one of its holes. Two Washers and a Nut are placed on the shank of the Bolt on the face side of the Bush Wheel, which is fixed to a 2" Rod that carries a 1" fast Pulley and is journalled in the centre holes of two 2½"×½" Double Angle Strips.

The driving pulley of a "Magic" Motor 4 is connected to the 1" Pulley by means of a Driving Band.

Parts required to build model Helve Hammer: 1 of No. 2; 3 of No. 5; 4 of No. 12; 1 of No. 22; 1 of No. 24; 23 of No. 37a; 20 of No. 37b; 3 of No. 38; 2 of No. 48a; 1 of No. 52; 1 of No. 90a; 1 of No. 111c; 1 of No. 125; 2 of No. 126, 1 Magic Motor (not included in Outfit).

The gun shown in Fig. 2 fires bullets consisting of Couplings. It is easy to build and its construction is commenced by assembling the supports for the barrel, details of which can be seen in the illustration. The barrel 1 is joined to a Rod 5 by two Couplings 3 and 4 fixed in the positions shown. The Coupling 4 forms the butt of the gun, and the Coupling 3 provides a bearing for a 1⅛" Bolt 6, on which the trigger, a Boss Bell Crank 7, is freely mounted. The bullets are fired by means of a spring-activated Coupling 2, which is free to slide along the barrel. To load the gun this Coupling is pulled backwards until it is gripped by the Coupling 8, which is mounted on a 1⅛" Bolt lock-nutted to the Boss Bell Crank 7. A Spring 10 pulls the Coupling 2 sharply back to its original position when the trigger 7 is released. The trigger is reset by a Spring 9, which is attached to the Coupling 8 and to the Rod on which the 1" Pulley is mounted.

Bearings for this Rod are provided by the Architraves, which are bolted to Flanged Brackets and the 5½"×2½" Flanged Plate forming the base of the model, by two 1½"×½" Double Angle Strips. These Architraves and Flanged Brackets are joined at their upper ends by means of a 2" Screwed Rod. A Coupling is lock-nutted on the 2" Screwed Rod carrying the 1" Pulley and the Rod 5 is gripped in its end transverse bore by a Grub Screw. The barrel of the gun may be raised or lowered to the desired angle by either turning the 1" Pulley or by moving the butt up and down.

A great deal of fun may be obtained by using the gun in a miniature shooting gallery.

Parts required to make novel gun: 4 of No. 12; 1 of No. 14; 1 of No. 15; 1 of No. 18b; 1 of No. 22; 26 of No. 37af; 17 of No. 37bf; 2 of No. 38; 2 of No. 43; 1 of No. 52; 1 of No. 59; 6 of No. 63; 2 of No. 81; 2 of No. 108; 2 of No. 111d; 2 of No. 115; 1 of No. 128; 1 of No. 139; 1 of No. 139a.

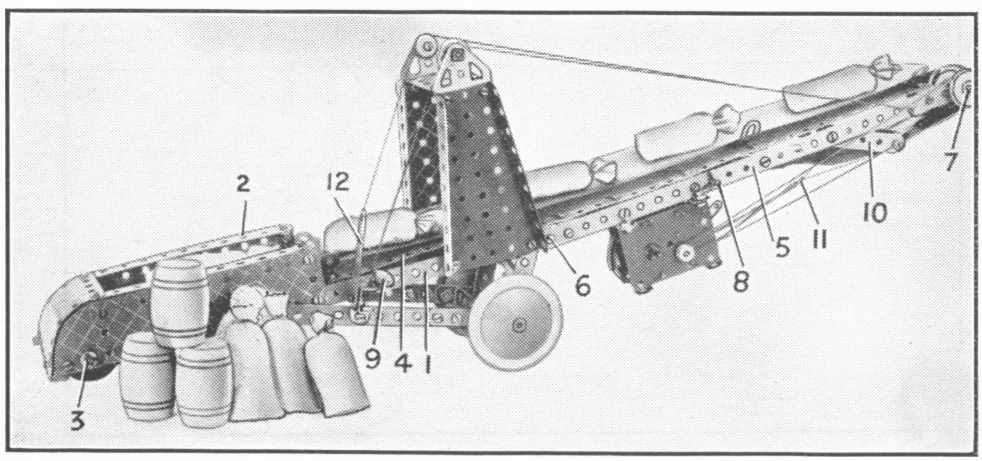


Fig. 3. Outfit No. 4 contains all the parts required to build this fine model conveyor.

Meccano Competitions

By "Spanner"

Cheques for Small Models

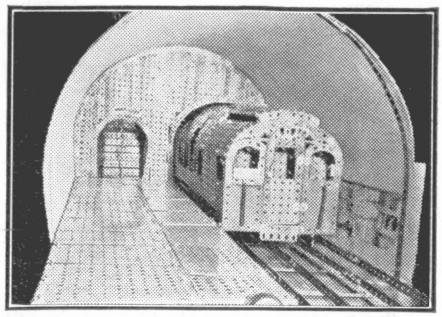
In this Contest prizes will be awarded to Meccano model-builders who succeed in constructing the most ingenious models with the smallest possible number of parts. Competitors should first choose a suitable subject and then build their models with the smallest possible number of parts consistent with a realistic effect. It must not be thought, however, that competitors are limited to any specified size of Outfit or quantity of parts. Any quantity or variety of parts may be used, but the prizes will be awarded to those competitors who succeed in constructing the most ingenious models from the least number of parts.

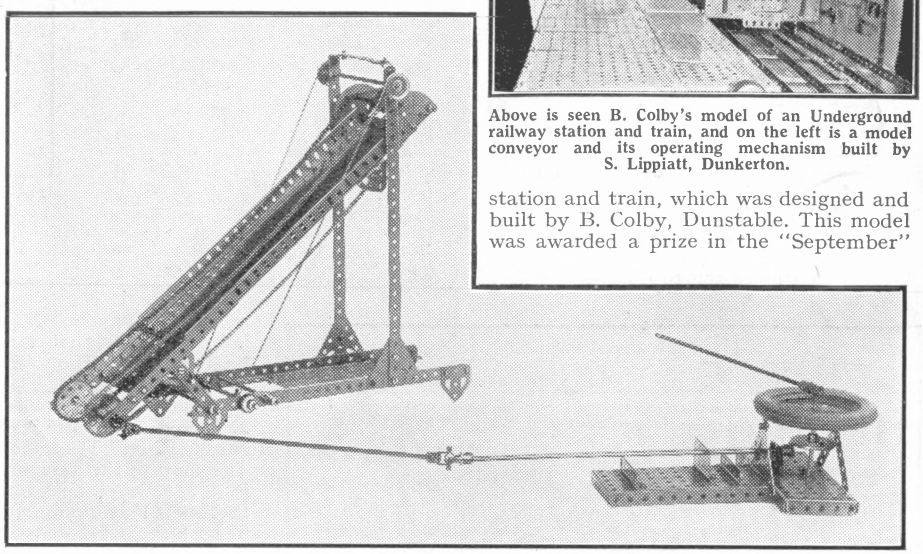
When the model is completed the competitor should obtain either a photograph or a good drawing of it and then send this to "Simplicity" Model-building Contest, Meccano Ltd., Binns Road, Liverpool 13. The actual model must not be sent. The competitor's age, name and full address must be written on the back of each photograph or drawing submitted for consideration.

Entries will be divided into two Sections as follows: Section A, for readers of all ages living in the British Isles, and Section B, for Overseas readers of all ages.

The prizes to be awarded in each Section are as follows: First, cheque for £2/2/–; Second, cheque for £1/1/–; Third, cheque for 10/6. There will also be several consolation awards consisting of Meccano or Hornby products value 5/– and Certificates of Merit.

31st March is the last day on which entries will be accepted from competitors living in the British Isles. Overseas readers must forward their entries so that they reach Liverpool not later than 31st July. Photographs or drawings of prize-winning models become the property of Meccano Ltd., but unsuccessful entries will be returned to the senders if a stamped addressed envelope of correct size is enclosed with the entry.

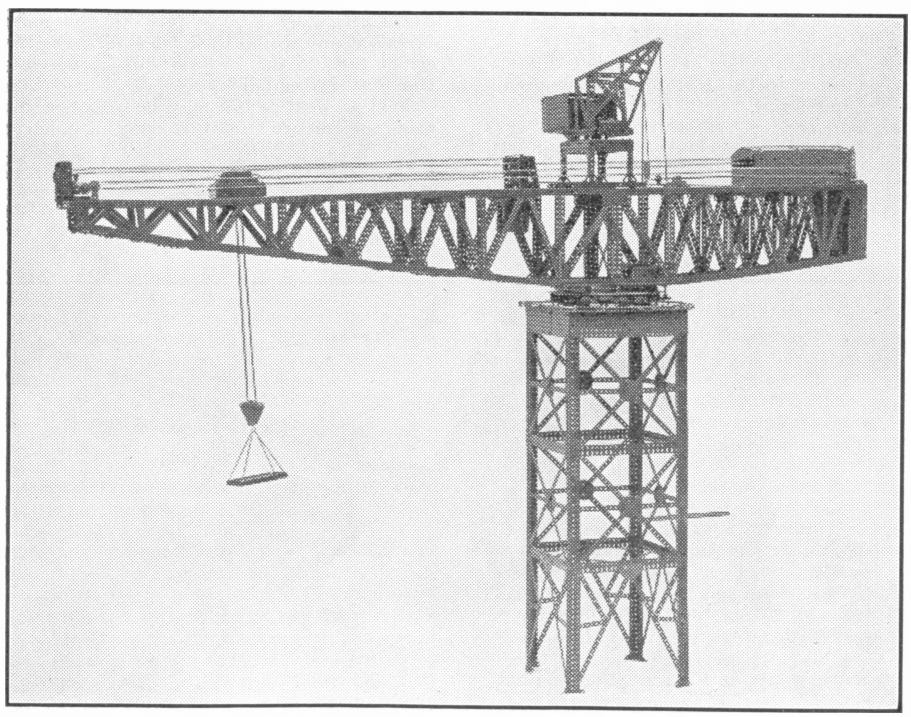




Above is seen B. Colby's model of an Underground railway station and train, and on the left is a model conveyor and its operating mechanism built by S. Lippiatt, Dunkerton.

More Prize-Winning Models

One of the most unusual models entered in recent "*M.M.*" competitions was a representation of an Underground railway station and train, which was designed and built by B. Colby, Dunstable. This model was awarded a prize in the "September" Contest, and it is shown in the illustration at the top of this page. The train is driven by an E20B Electric Motor, the current for which is supplied on the third rail system and returned to the running rails through the frame of the locomotive. The general appearance of the model is excellent, and the inclusion of miniature posters on the tube wall gives a very realistic effect.

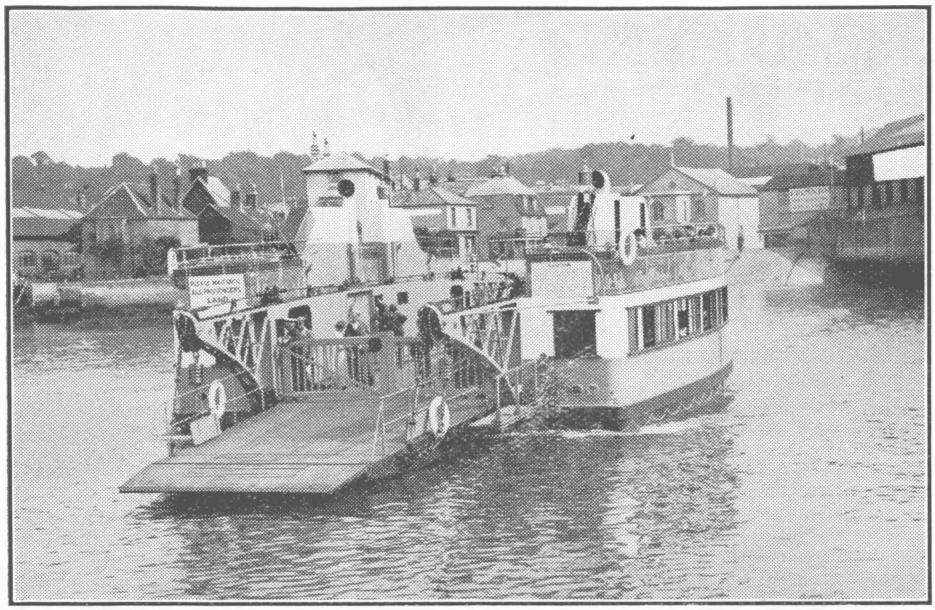


A fine hammerhead crane built by E. D. Clements, Farnborough.

The fine hammerhead crane seen in our lower illustration is the work of E. D. Clements, Farnborough, who was also a prize-winner in the "September" Contest. It is based on one of the world's largest cranes of this type, and great care has been taken to reproduce as accurately as possible not only the appearance of the actual crane, but also its mechanical details and movements. The massive boom rotates on a Meccano Roller Bearing, and is rotated by means of the special 16-teeth pinion supplied with the bearing, which is driven by an E20B Electric Motor and engages the lower Roller Race.

A special feature is the auxiliary jib crane that travels along the top of the boom. This is fitted with two pulley blocks operated by a No. 2 Clockwork Motor. The model is over 5 ft. in height, and the boom is 6½ ft. long.

Another model hammerhead crane won a prize for J. Lorimer, Manningham, Bradford. This is a remarkable piece of work, for its builder is blind and the greatest credit is due to him for the patient and careful work that earned for him a place among the prize-winners. Lorimer is a teacher of the blind and has been building models for 16 years. He says that he finds Meccano a splendid occupation for blind people and a most instructive method of satisfying their curiosity regarding the machines and other devices they hear about in their everyday lives. To such questions as "What is it like?" or "How does it work?" he has found that a Meccano model is generally far more effective than a description.



The novel electric chain ferry in service between East and West Cowes, in the Isle of Wight. The vessel is hauled along heavy chains laid across the bed of the River Medina. Photograph by courtesy of J. Samuel White Ltd., Cowes.

The Cowes Chain Ferry

A Novel Vessel with Electric Drive

By T. R. Robinson

CHAIN ferries are often employed as a means of transport across rivers of moderate width, for this method of propulsion, by which the vessel is hauled along heavy chains laid across the river bed, requires only the simplest kind of nagivation and enables an efficient service to be provided with a minimum of interference with normal river traffic.

Most chain ferries are driven by steam engines, but a very novel one, employing a unique application of electrical power, is now in service across the River Medina, between East and West Cowes in the Isle of Wight. It replaces a former steam ferry, and uses existing cross-river chains. The present craft has its chain wheels driven by an electric motor, the novel feature being that this motor draws its current partly from storage batteries and partly from a Diesel-electric generating set.

The ferry carries both passengers and vehicles of all kinds, and has a hull of pontoon shape, with hinged embarking and landing prows at each end of the carriage space, the overall length being 107 ft. The propulsion machinery is stowed immediately below the carriage deck, and consists of a 40 h.p. series-wound reversible motor coupled to the main driving shaft through helical reduction gearing. The shaft is provided with a slipping clutch at each end in order to equalise any variations of drive that may occur between the two chain-drive wheels. The driving shaft of the reduction gear is fitted with a shunt-operated magnetic brake.

The 10 h.p. motor that is employed for lifting the prows is also housed under the vehicle deck, together with its associated reduction gear, which reduces the motor speed of 1000 r.p.m. to a speed of 25 r.p.m. at the prow-gear shaft. The coupling on this final shaft is also used as the drum of a magnetic brake, which controls the lowering speed of the prows, and to prevent the raising or lowering of the prows beyond their correct positions limit switches are fitted to control the length of travel. A further 2 h.p. motor is also fitted to operate the bilge pump, and a small $\frac{1}{4}$ h.p. motor drives yet another pump used for transferring fuel oil.

Power for all these motors comes, in the first instance, from one of three Diesel-electric generating sets located below the deck of one of the passenger shelters. Two sets are provided, each consisting of a 27 b.h.p. Paxman Ricardo engine direct coupled to a 15 kw. 110 volt direct current generator. An auxiliary generator of 2 kw. 110 volt rating is directly coupled to each generator to provide lighting current for the vessel, and to supply separate exciting current for each main dynamo.

The storage batteries consist of 60 Exide Ironclad cells of 226 amp. hr. capacity, and these, together with the main switchboard and controls, are housed beneath the opposite passenger shelter on the other side of the carriage deck.

One generating set is used at a time, and when the ferry is standing idle the generator is employed to charge the battery. The heavy starting current needed to move the ferry away from rest is supplied by both the generator and battery operating in parallel, the excess current being supplied by the battery. As speed increases, the battery discharge falls, and a higher proportion of the total current needed comes from the generator. This parallel arrangement of generator and battery working together enables a smaller generator to be used than would otherwise be necessary.

In order to enable the battery to deal with its strenuous service conditions of rapid and alternate charge and discharge, it is arranged that the cells always operate in a 25 per cent. discharged condition. By this means, the battery can provide the heavy current necessary for assisting the generator at starting and the reduced output during the time that the vessel is under way, and at the same time deal with the rapid charging current that it receives between each trip without harm to the cells.

The work of the batteries on the Cowes Ferry is not only a new application for storage batteries, but in addition represents a unique method of operation. Once in every fortnight the battery is given a full charge during a time that the ferry is idle, and after this, about 16 trips are made on current drawn from the battery alone, this serving to return the cells to their 25 per cent. discharged condition. An advantage afforded by the fact that the batteries alone can propel the vessel is that any special emergency trips or movements of the ferry necessary to avoid other craft can be made without starting up the generating set.

In the event of a generating set failing, the alternative equipment can be used at once, and if the battery should fail, two of the generators may be used in parallel to supply current. Moreover, the combination of battery and generators provides a source of energy which is amply sufficient to deal with any accidental running ashore or jamming of the ferry, enabling it to be pulled off under its own power, when a similar mishap to a steam ferry would probably call for the services of a tug.

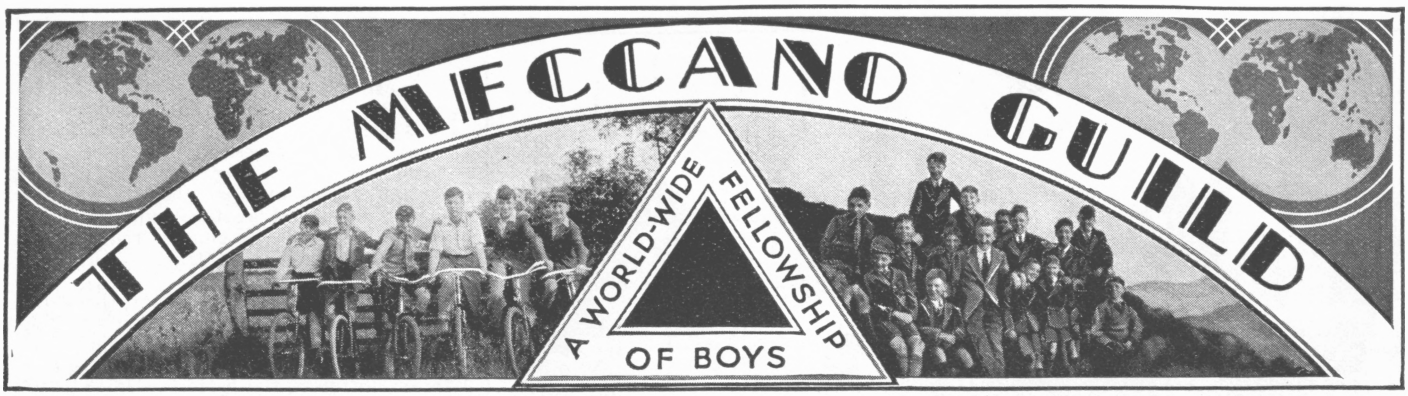
On each side of the central vehicle deck are located the passenger cabins, and above these are upper decks which provide additional passenger space. Both upper and lower decks are provided with seating accommodation, and the covered cabin space is lit by large windows, which can be opened in fine weather. Accommodation is provided for six motor vans, and about 500 passengers.

A complete electric lighting equipment is provided for the ferry. In addition, there is a navigation light at each end of the vessel, provided with automatic switching which illuminates the lights each time the respective prow gates at the ends of the vehicle deck are closed.

The ferry normally takes $1\frac{1}{2}$ min. to cross the river, and there is a stop of $3\frac{1}{2}$ min. between trips for loading and unloading. It is during this pause that the full output of the generator is used to charge the batteries. As the batteries are subjected to continuous heavy charge and discharge, careful arrangements have been made to give good ventilation to the battery space, and special vent pipes run to deck level.

An interesting feature of the ferry is that it operates right beside the shipyard in which it was built, for it was constructed by Messrs. J. Samuel White Ltd., of Cowes, whose premises adjoin the ferry stage on one side of the river Medina. Most vessels from shipyards travel far from their birthplaces, but this sturdy little craft performs its useful duties without going out of sight of the works in which it was constructed.

In operation, the Cowes ferry has proved perfectly satisfactory, and it seems likely that it may prove the first of a number of such craft on ferry service across rivers and estuaries. As very heavy peak charges can be taken from the battery, the new method of propulsion gives far more rapid acceleration than is provided by steam.



Meccano Games Nights

Games are a necessary part of the programme of a Meccano Club. In some cases a special Games Night is held regularly, while in others, particularly where long meetings are held, a special period at the beginning or end of each meeting is set aside for them. All the games that boys enjoy are used to the full, among them Table Tennis, Monopoly and football games, but good use can be made of games devices that that can be built up in Meccano. These combine the interest of model-building with the fun and frolic of a game, and the zest of members in both is thereby increased.

Many novel Meccano games have been described from time to time in the Magazine, and others can easily be designed and constructed by keen Club members. For instance, it is not difficult to devise a form of Bagatelle Table built of Meccano parts, with a base of say strong cardboard, or even plywood. The design of this and of other Meccano games could well be made the subject of a very interesting model-building competition.

A Meccano Shooting Gallery too is not difficult to plan, for various forms of Meccano guns shooting rubber rings or washers have been described from time to time in the "*M.M.*" A simple gun of this kind is illustrated and described on page 57 of this issue. The fun of a Meccano Shooting Gallery is heightened when an electric target is used, so that the scoring of a bull lights up a lamp. It would be easy for a Meccano enthusiast to design and construct such a target. I should be glad to make suggestions to those who are interested in the schemes I have outlined.

Between Friends

I have been agreeably surprised by the regularity with which reports of Club meetings and other events have reached me, especially since intense air warfare began. Without these reports I cannot keep members in touch with events, and much of the value, both of the work itself and of these pages, would be lost if I could not pass on news of Club affairs. To all who have been able to carry on so splendidly I send my heartiest congratulations. To the others I wish to say that I know their difficulties, but hope that these will not prevent them from writing to me regularly, even if meetings are not being held. I wish to hear from them, and to learn what their members are doing.

What I have said about reports applies also to photographs. The reproduction in these pages of the portrait of a Club official or of a group photograph invariably arouses the interest of members. They are delighted to show the issue of the Magazine containing it to their parents and their friends, so that the appearance of a photograph has excellent publicity and recruiting value. A glance through the Guild pages of recent issues of the Magazine will show the kind of portrait or photograph that is most suitable for reproduction, and I want all Leaders of Clubs that have not recently been represented in this manner to have photographs taken and prints sent on to me.

Merit Medallions Awarded in 1940

EDINBURGH (The Schoolboy Model Club)—D. Lancett, A. Dawson, M. Robertson, D. Clapton, T. Inglis, W. Inglis, S. Geercke, I. Johnstone. EXETER—H. R. Napper, C. Ewings, S. Ellis, F. Pyle, C. Aggett, B. Hackett, A. Smith, L. C. Pyle, R. Cobley, R. Hearn. HORNSEA—D. Parker, A. Tawn. ISLANDMAGEE—F. McKee, A. Forsythe, W. McCalmont. LIVERPOOL (Blundellsands)—N. S. E. Ellis. LONDON (Acton)—D. Kevan, S. Simmons.

OVERSEAS CLUB MEMBERS

AUSTRALIA (Maylands)—L. Hardie, G. Barker, R. Harris, J. Franklyn, J. Franklyn, N. Wood, G. Winnett, R. Harris, H. Pegg, J. Blair. MALTA (Lasallion)—F. Busuttil, A. Tabone, J. M. Demanuele. NEW ZEALAND (Christchurch)—K. Turner, S. Stringer. SOUTH AFRICA (Malvern)—N. Cowling, Joan Hilliar, Esme Carsons.

Merit Medallions in 1940

As usual this month I give the list of Merit Medallions awarded during the past year. It is not as extensive as in previous years, but when the trials and troubles of wartime are taken into consideration it can be regarded as very satisfactory indeed.

I congratulate all who have gained the Merit Medallion in this war year. Many others who no doubt would have qualified for the award have been prevented from earning it by inability on the part of their Clubs to carry on with their normal activities. I hope that 1941 will see the revival of these Clubs, and that this will be reflected in a longer list next year. There is an excellent prospect of this, and the large number of proposed clubs mentioned on this page is further evidence of increasing interest.

I wish to remind Leaders of Clubs to make the utmost use of the award. It is earned by any good work in connection with Club activities, and the Leader himself decides the nominations, two for each Session. Excellence in model-building, enterprise in suggesting programme items or in carrying on the official work of the Club, and success in recruiting are typical activities for which it is a reward, and in these times war and other outside work should be taken into consideration.

Proposed Clubs

BRISTOL—D. Leonard, 17, Stockwood Crescent, Redcatch Road, Knowle, Bristol 4.

CAMBRIDGE—P. Lindesay, Edendale, 84, Hills Avenue, Cambridge.

FLIXTON—N. Silverston, "Ardnadam," Irlam Road, Flixton, Nr. Manchester.

FORMBY—B. Murray, 34, Watchyard Lane, Formby, Nr. Liverpool.

HUDDERSFIELD—P. Class, 8, Longley Road, Huddersfield.

LIVERPOOL—G. Hall, 26, Ardleigh Grove, Liverpool 13.

LOCHGELLY—T. Mazzoni, 7, Ballingry Lane, Lochgelly, Fife.

LONDON—A. J. Read, Strand Palace Hotel, Strand, London, W.C.2.

NEW ZEALAND—M. McKenzie, Cr. Parsonage Road and Exeter Street, Waimate, S. Island, New Zealand.

READING—H. W. G. McKenzie, 11, Bath Road, Reading, Berks.

SOUTH ELMSALL—P. Whittaker, 69, Manor Farm Estate, South Elmsall, Nr. Pontefract.

SPRINGFIELD—B. W. Moseley, 8, Tippity Green, Springfield, Nr. Dudley.

Proposed Branches

AUSTRALIA—D. C. Norris, Ashby Street, Fairfield, S.3., Brisbane, Queensland, Australia.

BRISTOL—A. J. Farmer, 53, Melbury Road, Knowle, Bristol 4.

CAMBRIDGE—J. Duffield, 105, Hills Road, Cambridge.

HODDESDON—S. C. Taylor, 40, Murchison Road, Hoddesdon, Herts.

LEEDS—Mr. S. Booth, 2BK, Addington Street, Dewsbury Road, Leeds 11.

LEEDS—F. G. Simmons, 114, Talbot Road, Roundhay, Leeds 8.

LEYLAND—B. Grimshaw, 22, Hough Lane, Leyland, Nr. Preston.

LIVERPOOL—J. Waring, 158, Ackers Hall Avenue, Knotty Ash, Liverpool 14.

LONGFORD—R. H. Couchman, The Vicarage, Longford, Nr. Coventry.

NORWICH—V. J. Day, c/o The Vicarage, Great Witchingham, Norwich.

NOTTINGHAM—F. Dickens, 58, Loughborough Road, West Bridgford, Nottingham.

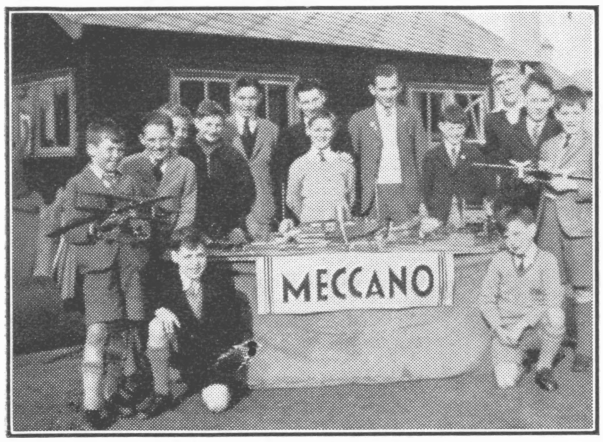
Branch Recently Incorporated

401. NEW ZEALAND—Mr. E. Idione, 215, New North Road, Morningside, Auckland, New Zealand.

Club and Branch News

Club Notes

Lostock (Stretford) M.C.—Normal activities continue in spite of the blackout and air attack. At each meeting a special subject for model-building is announced, and members bring their models to the next meeting for examination and discussion. A subject that gave rise to particularly good results was "Britain's Armed Forces." The models constructed included a destroyer with a depth charge apparatus, a Balloon Barrage Lorry, two aircraft carriers, a tank, an anti-aircraft gun and fighter aeroplanes. A special display of these models was arranged for the opening of the new Stretford Library. Club Roll: 30. *Leader:* Miss R. Ash, Lostock Branch Library, Barton Road, Stretford.



Members of the Muirfield (Dundee) M.C. display their models. Mr. J. Usher, founder and former Leader, is in the centre between his two assistants, and in front of him is E. B. Bowie, secretary. The club was affiliated in September 1940. Mr. Usher has left for business reasons, and has been succeeded as Leader by Mr. J. Jeans. Good model-building is the club's chief activity, and a special feature is made of the construction of model aeroplanes in balsa wood.

St. James School (Grimsby) M.C.—The Club has suffered a great loss with the removal to another school of Mr. H. V. Hayman, Leader. Members are carrying on splendidly under the direction of Club officials, and splendid models were built for exhibition at a local Bazaar. This display aroused great interest, and a photograph of it was reproduced in the "*Grimsby News*." Meetings continue to be held on Wednesday afternoons, and the time available is put to good use in model-building, generally of aircraft, woodwork and the flying of model aeroplanes. A Hornby Railway has been added to the Club's resources. There is an excellent stock of locomotives, coaches and goods vehicles, and Meccano bridges are being made. A timetable for operations is being worked out for regular use. Club roll: 14. *Secretary:* G. H. Howard, 8, New Haven Terrace, Grimsby.

Blundellsands M.C.—Members show great keenness and are not deterred by blackout and air raid conditions. They are particularly keen to suggest topics for meetings, and these are thoroughly discussed before adoption. When meetings cannot be held, members build models at home, where they are visited by the secretary and other officials. A collection is to be made for the Meccano "Spitfire" Fund, and it is proposed to form a Club Orchestra and give a concert. Club roll: 37. *Secretary:* J. K. Noel, 24, Lancaster Avenue, Crosby, Liverpool 23.

Ecclesall M.C.—Membership is increasing satisfactorily and one of the new members has built a splendid model, over 4 ft. in length, of an L.M.S. Tank Locomotive, incorporating a 20 v. motor. All members are busy with construction work, and the system of giving certificates for each model is helping to improve the standard of model construction. Club roll: 8. *Secretary:* T. K. Jones, 327, Millhouses Lane, Sheffield 11.

Muirfield M.C.—Members have now settled down in their new quarters. The standard of model-building is very high. The usual practice is for Mr. J. Jeans, Leader, to build a model and exhibit it to members, who then construct it for themselves. Monthly competitions are being held to stimulate interest in constructional work. A committee has been formed to run the Club, and this draws up programmes in advance for each meeting. Club roll: 12. *Secretary:* N. Lawson, 331, Kingsway, Dundee.

Totnes M.C.—Another successful Exhibition has been organised. A total of £5 was collected, and of this £3 was sent to the local "Comforts" fund. The models displayed included a mechanical man and a large viaduct, and an interesting Hornby Train layout was in operation. A German parachute and uniform on exhibition aroused keen interest, and at the stamp table gifts of stamps were sold in aid of the Meccano "Spitfire" Fund. Members of the Plymouth Club were among those present. Club roll: 20. *Secretary:* T. J. Macnamara, "Gables," Totnes.

Hillside (Whitefield) M.C.—A successful series of Model-building Contests has been held, the standard of model-building being very high. Lectures have been given on "*Naval Vessels*," "*Aircraft*" and "*A Night in the Life of a Bus*." First Aid lessons have been given by Mr. H. Norbury, Leader, and games and other amusements have been included. Club roll: 10. *Secretary:* D. J. Johnson, Burkewood, 27, Hillside Avenue, Whitefield, Nr. Manchester.

NEW ZEALAND

Spring Creek M.C. — Splendid models built by members have been displayed in the window of the Meccano dealer in Blenheim. Model-building meetings have been devoted to contracting work; tenders for construction were called planned their own work before for from groups of members, who submitting their estimates. Games meetings have been held, and interesting hockey matches have been played. All branches of the Club's activities are now being carried on with enthusiasm, and interesting developments are expected. Club roll: 8. *Secretary:* J. Cresswell, Spring Creek, Marlborough, New Zealand.

Branch News

Edgbaston (Birmingham).—Saturday afternoon meetings have proved so popular that all meetings are now held at this time. A system of ticketing goods trucks has been adopted and has proved very successful. Passenger train working was the main feature of one recent track meeting, and several interesting special excursions were run. Plans made for a model railway exhibition include both gauge "00" and "0" layouts. *Secretary:* R. B. Scotham, 167, Church Lane, Handsworth Wood, Birmingham.

Rockport.—Excellent train running has been accomplished. The goods yards have been redesigned, and all necessary shunting can now be done without involving the use of the main line. 0-4-0 tank locomotives are employed for the shunting. A diversion from these activities has been the building with Meccano of a machine for loading coal and stones. *Secretary:* T. W. V. McMullan, Rockport School, Craigavad, Co. Down.

Pontypridd No. 1.—Good progress is being made by this recently incorporated Branch. The layout has been enlarged, and the track is being relaid upon a raised baseboard. Electric and clockwork train running, and shunting practices have been carried out. The secretary has given a conjuring entertainment. *Secretary:* G. Gwilym, School House, Hawthorn.

Norwich. — Blackout conditions have hampered members, who are as active as conditions allow. The Branch layout has been greatly improved, and is now well supplied with track accessories and with Dinky Toys models to add realism. The Branch Library is very popular. The Cycling Section is to resume activities as soon as better weather comes. *Secretary:* K. Fanthorpe, 132, Magdalen Street, Norwich.

Goudhurst School.—The track has been relaid several times, and the present arrangement is the result of various experiments. A fine selection of locomotives is available, including a "Royal Scot" and a Riviera "Blue," and these give scope for excellent running operations. Particular attention is to be given to the provision of stations and the introduction of Pullman Coaches for emergency expresses. The lighting installations at the stations are to be overhauled. Members use the Branch room at all times, a special day being set apart for the discussion of Branch business. *Secretary:* B. A. Wood, Goudhurst School for Boys, Bethany, Goudhurst, Kent.

Clyde College (Largs).—At present clockwork trains are run, as the Branch room is not yet supplied with electric current. It is hoped that this will be introduced, so that electric trains also can be run. So far temporary layouts have been used, including Hornby-Dublo layouts, and excellent running has been enjoyed. Members are very keen on the planning of layouts and schemes for running. *Secretary:* W. W. Binnie, Clyde College, Routenburn, Largs, Ayrshire.

Martinwhite (Guildford).—Meetings have been devoted to the designing of layouts and the experimental running of train services on them. Wire for lighting purposes has been presented to the Branch. A Meccano bridge on the layout has been reconstructed and widened, with a footpath alongside. Track meetings are now continuing. *Secretary:* T. M. White, Bingham Stoke Road, Guildford.

Acton.—Construction of the new Branch layout continues, and a useful discussion was devoted to questions concerning Points. At the monthly Film Show, a travel picture, "*Across Alaska*," was seen, and this was followed by a film of pioneering days in the western United States. The meetings are held on Saturday afternoons, but track meetings have now been arranged for an evening each week. *Secretary:* S. W. Simmons, 37, Derwentwater Road, Acton, London W.3.

Folkestone.—War conditions have made it necessary to shorten the meetings, but good work is being carried out, in spite of slight damage caused during an air raid. Signal boxes have been completed for three of the stations, and these have been brought into use. A model "*Spitfire*" has been constructed. It is extremely realistic in appearance. A Milk Office has been opened on the Branch track, and more signals are being built. *Secretary:* F. E. Saunders, 79, Dover Road, Folkestone.

Monkstown (Co. Dublin).—Track meetings continue, operations being carried out to timetable with great success. Electric lighting equipment has been put into service at one of the termini of the layout and in the Engine Shed. A portion of one meeting was devoted to the consideration of programme suggestions by members. The Library now contains over 70 books, and has been further extended by the purchase of two books on railway subjects. *Secretary:* R. D. Pierce, 20, Monkstown Road, Monkstown, Co. Dublin.

NEW ZEALAND

Wellington West.—A start has been made with the construction of the Hornby Dublo layout. The Hornby-Dublo Locomotive "*Sir Nigel Gresley*" has already been obtained. Members are looking forward to interesting operations on their extensive track when it is complete. It will provide them with ample scope for the provision of scenery, tunnels, bridges and cuttings, for it will be 300 ft. in length. Monthly Supper Nights continue, games being played and refreshments enjoyed. An ex-member who has joined the Army paid a welcome visit. Members of the Camera Section have prepared for the summer activities, and interesting photographic results are expected. *Secretary:* K. R. Cassells, 26, Sugarloaf Road, Brooklyn, Wellington, New Zealand.

Mr. J. Bainbridge, Chairman, and members of the Kinglassie (Fifeshire) Branch No. 386. This branch was incorporated in February 1940. Our photograph was taken at a special Exhibition in aid of local war efforts, when the Hornby layout was made especially realistic and attractive by the use of Dinky Toys.

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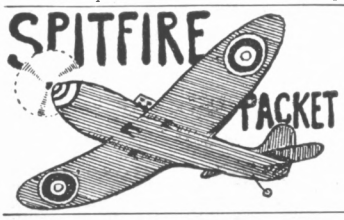

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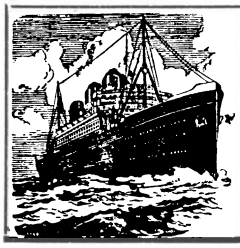

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STAMP COLLECTING

How to Make Stamp Collecting Pay

SO many of our readers have taken up stamp collecting during recent weeks, possibly as the result of a Christmas gift of an album and a packet of stamps, that it will be useful to consider the financial side of the hobby and try to discover ways and means of making it pay. Stamp collecting can be made to pay, and a good collection can always be sold to bring back the greater part of its cost. Indeed, in many cases it can be made to show a profit, but we do not want our readers to run away with the idea that stamp collecting is a sure way to a quick fortune! The first considerations in building a collection are its interest and the enjoyment to be gained from it. Surprising though it may seem, a keen appreciation of stamps for themselves actually is the most helpful equipment for the collector who seeks to make his collection worth while financially. It may be asked if it is really possible for a boy to get hold of stamps that will grow in value. The answer is a very emphatic "Yes!" He can do it by buying only good stamps, and happily good stamps are not necessarily old, rare or costly. Many indeed that can be bought cheaply to-day will almost certainly rise in value, steadily if not quickly. Many of the great rarities of to-morrow are to be found among the new issues of to-day. Most of our readers know of the famous Prussian Blue variety of the blue 2½d. stamp issued to commemorate the Silver Jubilee of King George V in 1935. One cannot buy that stamp to-day under £17 or £18 for an unused specimen, or £40 for a genuine postally used copy. Yet those stamps were sold over a Post Office counter in 1935 for 2½d. each. A keen collector spotted the difference in colour, bought up all that office had, and promptly sold them to a dealer at a handsome profit.

Stamps that will grow in value. A commemorative from the New Zealand Anzac issue of 1936, and the Austrian Railway Centenary issue of 1937. Short-life issues such as these are always worth buying.

Before we attempt to offer suggestions that will help in the identification of stamps that may prove to be the valuable stamps of to-morrow, we want to lay down one important rule, a rule that *must* be observed by everyone who seeks to make his collection a good one. This is that only stamps in perfect condition should be collected. The slightest flaw in a stamp, such as the absence of a single perforation tooth, or the tiniest tear, makes a great difference in its value. Torn stamps, heavily postmarked specimens, or those with stamp edging stuck to their backs as mounts, are almost worthless and should be rigidly excluded from the collection.

If any reader doubts the wisdom of this advice, let him take a couple of album pages and mount on one a series of unused or clean used stamps. On the other let him mount a batch of torn and dirty specimens. Then let him ask himself which he would rather buy. There can be only one honest answer. Only perfect stamps therefore should be bought, and used specimens that are heavily postmarked, or in which even a light mark obscures some important part of the design, should be ignored. This may involve searching for good copies, but that surely is part of the thrill of collecting.

Good used copies of the stamps of certain countries are hard to find. India is such a country, for it uses a heavy cancelling stamp, known as a "killer" because its heavy black cancellation kills the possibility of a stamp being used a second time. The United States also uses a "killer," but in both countries there are many offices that use a normal handstamp and good specimens therefore can be found. Their cost to-day is only a fraction above that of a "killed" specimen, but to-morrow the good specimen will be worth 20 or 30 times the value of the other.

Another good rule is to keep every clean stamp that comes along, no matter how many specimens of that particular issue are already owned. Some of those duplicates can be exchanged, and the others can be sold in bulk to dealers and the money used to buy wanted specimens. This advice applies particularly to those boys who rely largely on supplies of stamps from the office correspondence of relatives and friends. They receive a vast proportion of duplicates and all too often treat them with disdain.

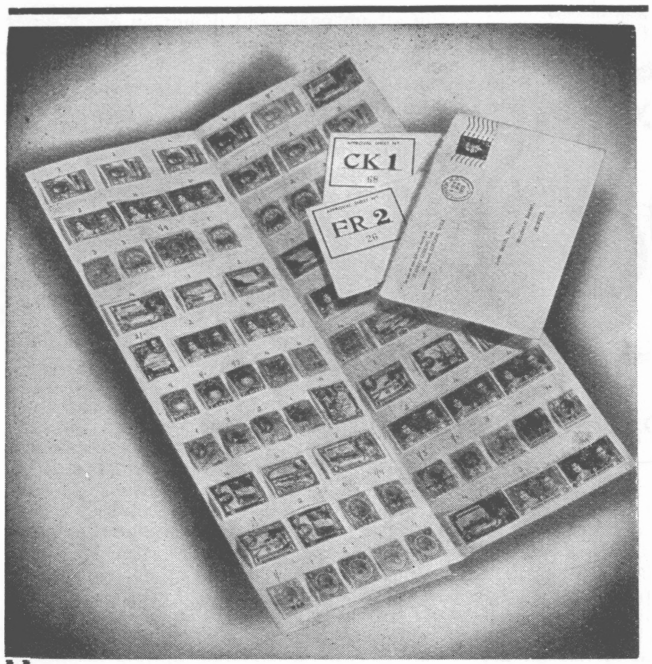
A novel postmark that is worth keeping.

No collection that depends solely on such gifts can hope to attain great scope. Stamps must be bought to fill the gaps, and it is in buying that the ultimate value of the collection is decided. One must buy specimens that are likely to increase in value. That is not so very difficult, for the value of stamps, like that of every other commodity, follows the laws of supply and demand.

One of the inverted centre varieties from the U.S. Pan-American Exhibition issue of 1901, to-day catalogued at £65.

A stamp of an issue that is in use for a very long period, and therefore is issued in huge quantities, cannot hope to attain rarity. An example is the "Penny Red" of Great Britain. It was issued with various slight differences of shade, watermark, perforation, or printing plate, over the years from 1854 to 1879. Some of the varieties are very rare and are catalogued at several hundreds of pounds, but ordinary specimens can (Continued on page 65)

This envelope, bearing the two famous "Post Office" Mauritius stamps, is considered to be "philately's rarest piece". It was sold for £5,000 in June, 1934, at Harmer's of Bond Street, and was originally in a schoolboy's collection.



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Books for Beginners in Stamp Collecting

Stamp collecting, like every other hobby, must be carried out on sensible lines, or half the fun and pleasure it brings with it are lost. The stamp articles included every month in the *"M.M."* are intended to help beginners to start collecting in the right way, and to get more and more pleasure from their hobby as time goes on.

Unfortunately, the space that can be devoted in the *"M.M."* to stamps is strictly limited, and readers are strongly recommended to buy one or two of the many excellent and cheap books on the hobby that are now available. A very useful general book is *"Stamp Collecting for All,"* by Mr. Stanley Phillips, which is published by Stanley Gibbons Ltd. at 1/–, or 1/2 post free. In spite of its small size this book is fully up to date and can be strongly recommended. Books in the "Stanphil" series, also published by Gibbons at 1/–, or 1/2 post free, are of particular interest to those who wish to specialise in stamps depicting certain subjects. For instance *"By Air Through the Stamp Album"* deals with stamps that Illustrate flying from its earliest days up to the present time; *"Native Races of the Stamp Album"* describes stamps that illustrate native races and customs; and *"Land Transport in the Stamp Album"* covers stamps illustrating transport from the chariot age, and even earlier, up to the modern motor car. There are also two interesting volumes dealing with beasts, birds, fishes and reptiles, and one illustrating the story of the British Empire in stamps. These little books have been the means of introducing to the stamp hobby many readers who are not interested in general collecting in the ordinary way.

Finally, readers may be reminded that the Stamp Editor of the *"M.M."* is always delighted to answer any queries, or to give information to stamp enthusiasts, whether they are beginners or have been engaged in the hobby for a considerable time. Reading the books mentioned, and others reviewed from time to time in the *"M.M.,"* and keeping in touch with the Stamp Editor, will add enormously to the interest of collecting, and the knowledge gained will enable readers to study with greater profit the offers made by our advertisers. It should be made clear, however, that the Stamp Editor is not prepared to value stamps.

Seeing by Invisible Light

Some day motor cars may run at high speeds along roads at night without any visible means of lighting, yet with the road in front of them clearly picked out for the driver. When this happens what is known as black light will have come into its own. The purpose of most lights is not to reveal themselves, but to show up something else; and black light can be made to do this perfectly. It is light outside the visible range, in the ultra-violet section of the spectrum, and has the power of making certain substances glow. The substances are introduced into paints, dyes and inks, and the articles and materials treated with these immediately become visible when they are illuminated by the black light. In the case of a road, lines painted in the middle and at the sides can be made to glow in black light by introducing one of the special substances into the paint used.

Ordinary lamps yield black light, but this is best obtained from mercury vapour lamps, in which the vapour of the metal is made to glow by passing an electric current through it. A black glass filter is necessary to cut out visible light. This may be the glass of the bulb itself or a screen placed in the path of the rays. The most practical scheme is to use a mercury vapour lamp with a filter of black glass, which does not have to be replaced when the bulb itself is broken.

Anyone who looked at a black light lamp would see only a glowing core at most, but his view of it would be hazy because the light causes slight fluorescence or glowing of the eyeball itself. His teeth and finger nails would glow, but otherwise he would be invisible. His teeth would not show unless they were real, however, for the kind that the dentist provides do not respond.

One application for black light is in the lighting of picture houses. A patterned carpet on the floor or on steps can readily be made to glow by directing the beam of black light upon it, and it serves then as a guide in the darkness without producing dazzle. Black light also has been used in detecting adulteration of materials that glow when the light falls on them. Butter and eggs are two of these. Butter shows a yellow glow under the rays, while margarine appears to be mauve; a fresh egg glows red, which becomes brown when the egg grows old. Diamonds are sorted by testing them with black light, some kinds glowing brightly and others very little.

Fishing by Moonshine

Does the Moon affect fishing? This problem has been seriously discussed by an American angler, who has worked out a scheme to tell him the best times to go fishing on inland waters. The idea behind his scheme is that of certain ocean fishermen who believe that tides bring food to fish. The tides of course are due to the action of the Sun and the Moon on the oceans, and by taking both of them into account he worked out a kind of fishing calendar, showing the dates that good catches may be expected.

Many will laugh at this story. The author of the idea has published tables for several years as a guide to fellow anglers, however, and many of these on looking back over their experiences have been astonished to find that they have caught fish freely and easily at exactly the times indicated by the tables.

Winds Above Hurricane Speed

Wind speeds of well over 100 m.p.h. have been recorded in hurricanes sweeping over parts of the United States. Even these terrific speeds fall far short of those of winds that have been produced in gases by passing electric arcs through them, and the artificial winds have the further distinction of being at temperatures of 12,000 deg. F. or more, so that they are hotter than the surface of the Sun. Fortunately these terrific blasts are produced on a very small scale within apparatus of enormous strength, and the experimenters are further protected by a barricade of sandbags, for the gases are subject to pressures ranging up to 3,600 times that of the atmosphere, or about 27 tons per sq. in.

The effect of pressure on the electric arc was found to be remarkable, and it varied with different gases. In hydrogen an increase reduced the arc to a very tiny thread, and stopped it altogether when a pressure of above 20 times that of the atmosphere was reached. An arc in nitrogen can survive a much higher pressure, and the helium arc is even more resistant.

The changes observed are believed to be due to cyclones or convection currents in the gases. The heating effect of the arc causes the high temperature of nearly 12,000 deg. F. to be reached, and the currents of heated gas that rise in consequence form the artificial winds, faster and more devastating than any in Nature. It is fortunate that these are on a minor scale, and are not set loose to create greater havoc even than a hurricane can leave in its trail. All that they can do in the limited space allowed them is to blow out the arcs.

How to Make Stamp Collecting Pay—

(Continued from page 63)

be bought to-day for 2d. and 3d.

It will be seen that age is not necessarily a factor making for great value. Nevertheless, there are many early British Colonials, catalogued at a shilling or two to-day, that are really undervalued, and the boy who concentrates on collecting all he can afford in this field will almost certainly reap a profit. He should look for issues whose values have remained stationary in the catalogues for some years, and then hunt around the dealers' shops for good copies.

Among modern issues, the items to be sought are those that have but a limited life, such as British Colonial commemorative issues. These invariably increase in value very soon after they have ceased to be on issue. The King George V Silver Jubilee series provides an illustration, for the complete unused series of all Dominions and Colonies now sells at auction sales for £18 to £20. At the time of issue it cost only a shilling or two over £4. Not many boys were able to afford a complete set, but we know several who bought individual sets of various Colonies, at prices ranging from 8d. to 1/6. Not one of those sets could be bought to-day under five or six shillings.

Wherever possible when buying modern sets, the complete set should be bought. If funds do not permit buying the lot at one go, then the low values should be secured first and the remainder built up as opportunity affords. A complete set is always worth more than the proportionate value of an incomplete series.

Many readers do not know that novelties command high prices. In fact they command very high prices because they are novelties, and it behoves everyone to keep a keen eye open for unusual things. We have already mentioned one good example in the Prussian Blue 2½d. Jubilee issue. Another, and an even more striking one, is the variety from the United States Pan-American Exhibition issue of 1901, illustrated on page 63. A boy collector once refused to have this stamp in his collection because "there was something wrong with it." Actually its centre is inverted, and to-day this variety is catalogued at £65.

Here are two other examples that we have gleaned recently from our own private correspondence. One is a current Great Britain ½d. stamp that has an all-green surface, instead of being white outside the printed design, and the other is an envelope bearing an unusual postmark, "London Batt. Temp. Office."

The ½d. stamp probably is worthless, and the green background is due to faulty wiping of the printing plate. But it tells a little story of the manner of printing the stamp, and is worth keeping. The postmark, illustrated on page 63, calls for further enquiry.

(Continued on page 70)

Stamp Gossip

and Notes on New Issues

The First Airmail

The world's first official airmail flight took place 30 years ago this month. We wonder how many of our readers who specialise in airmail stamps could say where that flight took place? It was in India, at Allahabad, on 18th February 1911, and the occasion was an agricultural exhibition.

Capt. Wyndham, who was then touring India seeking to arouse popular interest in flying, obtained the consent of the Postmaster-General to a scheme to fly mail from the Exhibition grounds to Nani Junction, five miles distant. The mail flown consisted of 6,500 letters and postcards, and was carried in an aeroplane piloted by a Frenchman, H. Pequet. An official cancellation *"First Aerial Post—U.P. Exhibition, Allahabad"* was applied to each cover.

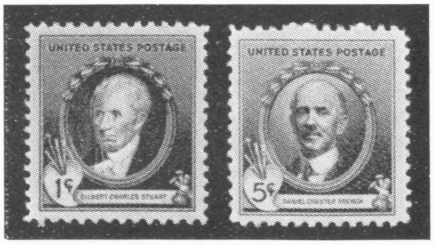
Indian airmails have progressed far since then. To-day the greater part of the inland mail is flown in great machines of the type shown on the newly-issued 14a, stamp illustrated here.

The Japanese Dragon Dance

We illustrate this month the recently issued Japanese stamps celebrating the 2,600th anniversary of the founding of the Japanese Empire.

The low value, 2f., is a reproduction of a proclamation issued by the Japanese Prime Minister, Mr. Chang Chin Hui, to commemorate the event. Note the butterfly at the foot; this is one of the rare appearances of a butterfly on stamps.

The higher value 4f., shows a group of Japanese children performing the Dragon Dance. In this dance, which is based on the ancient legend of the dragon that



sought to devour the Sun, the performers carry an effigy of a dragon on poles, and in front of it a paper lantern representing the Sun. As the dance proceeds, the performer carrying the lantern goes through quaint evolutions that always keep the "Sun" out of reach of the dragon, thus maintaining the idea of the story, in which the dragon sought to overtake the Sun during its sleep, that is at night, but was never fast enough to catch it.

* * * *

We illustrate this month the remaining two designs from the recent American artists series—Gilbert Charles Stuart on the 1c. value, and Daniel Chester French on the 5c.

A Portuguese Centenary Issue

The restoration of the Kingdom of Portugal in 1640, after it had been under Spanish rule for 60 years, is commemorated by the Mozambique Company in an issue of six stamps. Each bears the design shown here, an equestrian portrait of King John IV, who was the founder of the Braganza dynasty that survived until the revolution of 1810, when Portugal became a republic.

The Postal Centenary Issue

A recent reply in Parliament gave the quantities of Stamp Centenary commemorative stamps issued in Great Britain, as follows: ½d., 82,256,000; 1d., 230,880,000; 1½d., 31,392,000; 2d., 121,005,000; 2½d., 312,096,000; 3d., 22,007,000. Supplies overprinted for use in the Morocco Agencies were as follows: Overprinted "Tangier"; ½d., 139,000; 1d., 130,000; 1½d., 116,000. Overprinted "Morocco Agencies" and surcharged; ½d. (5c.) 480,000; 1d. (10c.), 265,000, 1½d. (15c.), 190,000; 2½d. (25c.), 165,000.

Supplies of the stamps were exhausted in Britain in October of last year. Isolated stocks are still held by branch post offices here and there, and readers who have not secured a set of this issue should make haste to fill the gap in their collection. In spite of the huge quantities issued, the set will certainly grow in value before long.

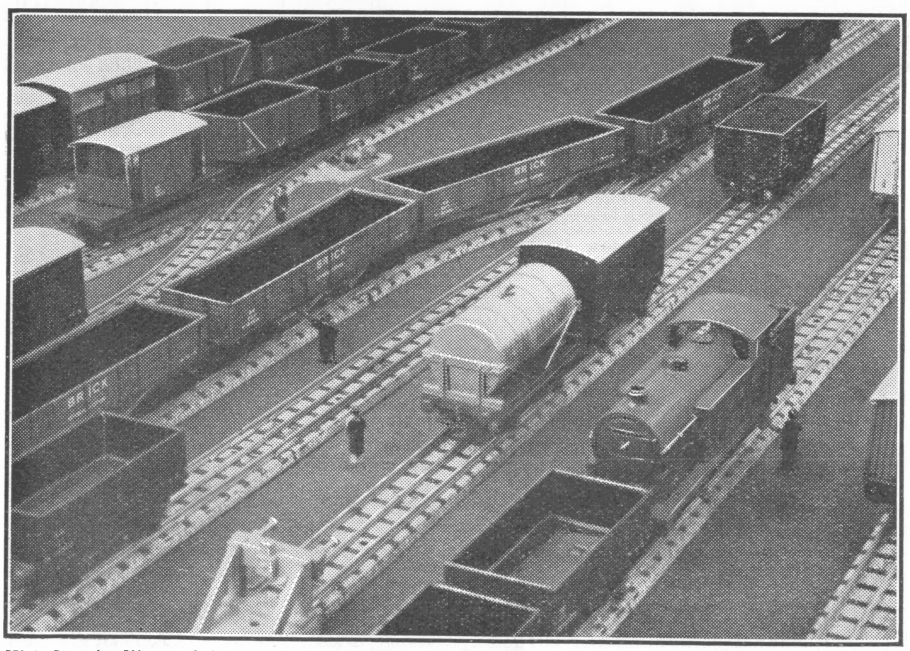
Stamps in Advertising

Recently an American tailoring firm hit on a happy idea when issuing a circular letter to their customers. They pointed out in the letter that the material in their suits contained alpaca from Peru, guanaco yarns from Chile, wool from Australia and the United States, and mohair, also from the United States. Stamps from the four countries, depicting the source of the materials, were mounted on the letter.

Adding to a Hornby-Dublo Layout

ONCE a Hornby-Dublo railway has passed through the earliest stages of development, and has begun to look like a real system, the owner next sets about extending and improving his line. More track and more rolling stock are usually obtained, and in order to use these to the best advantage it is necessary to know something of the material available in the Hornby-Dublo range.

Most model railway owners wish to have a double track main line, and this is made possible by the use of Large Radius Curved Rails. These are specially designed to fit outside the standard radius curves at the correct distance apart from them.



High-Capacity Wagons being shunted in the sidings on a large layout. The various miniature figures add greatly to the realism of the scene.

Perfectly symmetrical curves are thus formed, and there is no difference in the number of rails required on the straight portions of either the inner or outer track, nor are any further special rails necessary. Perfect alignment of the "up" and "down" tracks, so characteristic of real practice, is thus assured, and a tidy appearance generally is given to the miniature "permanent way."

Connection between the inner and outer track is effected by means of crossovers. These are formed by the use together of two Hornby-Dublo Points, each of the same "hand" or direction of turnout. The straight portions of the Points form part of the ordinary straight main line, the actual connection between the two tracks being by means of the curved sections of the Points.

A crossover can easily be arranged between up and down tracks that are already in position. The straight portions of the Points are equal in length to a standard Dublo straight Half Rail; when two Points are used to make a crossover the trailing ends of the straight sections come exactly opposite to one another, needing only the addition of a straight Half Rail to each trailing end to complete the whole unit. A crossover can thus replace two full Straight Rails, one on each of the two tracks that are to be connected by the crossover.

In its earlier stages a layout usually has one siding, or perhaps more, where the rolling stock can be kept when not in use. Generally these are of the dead-end type terminated by Buffer Stops, the siding tracks lying parallel with the main line. It is easy to convert such a siding into a loop line, a loop being particularly useful in miniature as it can be entered or left in either direction by a train, without the necessity for any of the reversing movements necessary when a dead end siding is in use. As the result of the relation between the Straight Rails, Curved Rails and Points of the Hornby-Dublo System, the straight portion of a loop line is always less in length by one Straight Rail than the corresponding straight length lying between the two Points at each end of the loop. This makes it easy to work out the number of pieces required to convert a siding into a loop, or to lay in a new loop line.

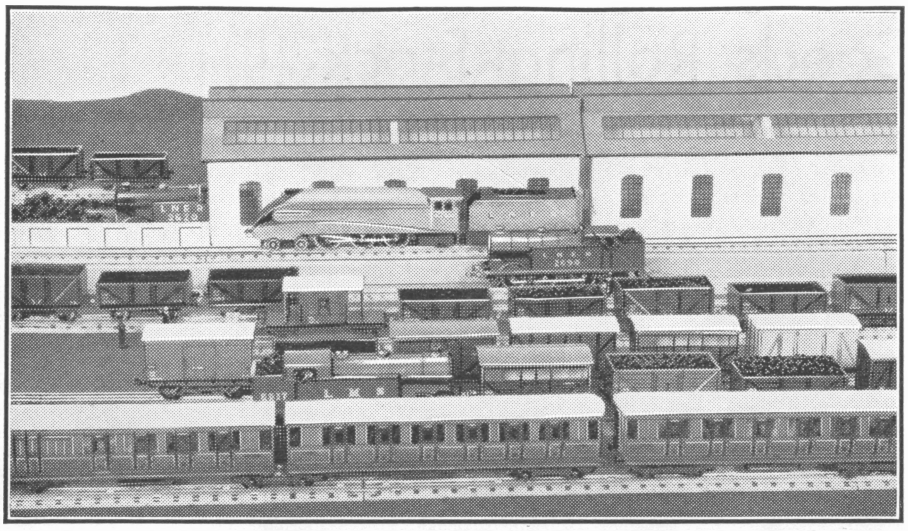
Quite often a single-platform station with a siding alongside the main line is developed into a two-road station, the siding then being converted into a loop so that separate up and down tracks are available through the platforms. This is just one instance where the details given in the previous paragraph come in useful.

A necessary piece of track on every layout is the Curved Terminal Rail, and one of these is included in each Hornby-Dublo Electric Train Set. When the single main line is developed into a double track system, a Large Radius Curved Terminal Rail is necessary if a separate power supply is to be connected to the outer track so that independent control can be exercised on each track.

A specially useful track unit is the Isolating Rail. This is necessary when it is required to render a siding "alive" or "dead" according to the train movements to be carried out. The terminals on the Isolating Rail are connected to the special Switch D2, which then controls the supply of current to the siding concerned. Where a loop line is to be controlled in this way two Isolating Rails are necessary, one at each end of the straight portion of the loop for preference. Only one of the Isolating Rails needs to be connected to the Switch, the other Isolating Rail merely being required to provide an insulating gap in the track.

Operations that become possible with the introduction of Isolating Rails and the splitting up of a layout into sections have been dealt with previously in these pages, but it is intended to give details of further schemes in a future article.

With the addition of more track to a simple layout, more rolling stock becomes necessary to provide additional trains. The Two-Coach Articulated Unit of the Passenger



A fine display of Hornby-Dublo Rolling Stock with Locomotives and an Engine Shed in the background. The Two-Coach Articulated Unit and the Corridor Coach in the foreground make a splendid "set train" for main line work.

Train Sets can be supplemented by the Corridor Coach D1, a self-contained eight-wheeled vehicle of similar outline and finish to the components of the twin unit. These together form a splendid passenger train typical of L.N.E.R. main line practice. A favourite scheme in operation is for the Corridor Coach to represent a "through coach" for a destination different from that of the twin unit forming the main part of the train.

Many readers develop suburban passenger train services in addition to the main line running afforded by the streamlined "*Sir Nigel Gresley*" and its train. For these the standard 0–6–2 Tank Locomotive from the Goods Set is ideal, and for rolling stock a Two-Coach Articulated Unit is most useful. If necessary the Unit from the main line service can be used in between long-distance journeys; alternatively when possible it is a good scheme to have another Articulated Unit reserved specially for local passenger work. Articulated suburban trains are widely used on the L.N.E.R. in actual practice and the lower illustration on this page shows miniature Articulated Units in use on the "Suburban side" of the City Station.

To the general service Open Wagon and Van of the Hornby-Dublo Goods Train Sets, goods equipment can be added so that perishable trains of Meat Vans and Fish Vans can be run. On smaller layouts this traffic can be handled by single Vans of these types. The Cattle Trucks can be run singly in general goods trains. Each of the vehicles so far mentioned, together with the Horse Box, a most attractive piece of rolling stock, can be run in passenger trains when required.

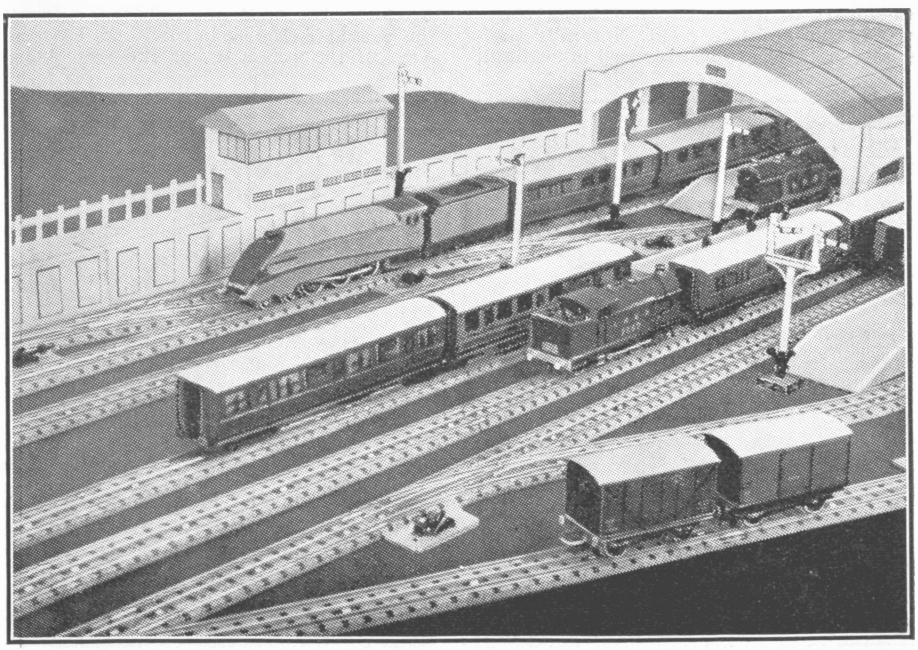
Coal and mineral traffic generally calls for the Coal Wagon D1 and the High-Sided Coal Wagon D2, a mixed train of which, with a High-Capacity Wagon D1 next to the engine, make a splendid mineral train. The High-Capacity Wagon D1 is actually designed for brick traffic, but the real ones can be employed for road stone and similar loads. Tank Wagons also introduce a special type of traffic that is very important in these days. A point to remember is that tank wagons carrying petrol should always be placed in the centre of the train if possible; they are then as far away as they can be from the ends of the train, where their presence might be dangerous in the event of a collision or other mishap.

As a rule a layout will commence with a Main Line Station. Doubling of the track will involve the addition of another similar Station, or perhaps an Island Platform, to serve the additional track. The Island Platform requires little space and it provides further variety, although its general construction is made to conform with the style of the Main Line Station.

Additions to the buildings on the line will probably take the shape of the Goods Depot, or the Engine Shed, which has several uses apart from the particular purpose for which it has been designed. It makes an excellent carriage shed, and we have previously suggested its use as a motor depot for Dinky Toys vehicles connected with the railway, or a bus depot.

Additional Signal Cabins are necessary when the track layout is extended, and where space permits the City Station Outfit will provide an imposing terminal station or a realistic through station of the larger junction type.

To give "life" to the layout the figures of the sets of Miniature Railway Staff or Miniature Passenger can always be used to advantage almost everywhere on the line. They are seen in realistic attitudes in practically all the illustrations that appear in these pages month by month.



A splendid terminal station formed with City Station Outfit components. An express train is leaving the main line platform and a local train is seen on the "suburban side" of the station.

Hornby Goods Rolling Stock (II)

LAST month we considered particularly the various Vans of the Hornby Series, of both No. 1 and No. 0 types, that are intended for perishable traffic trains. This month we have to deal with those more suitable for general use, although several types can be used quite well for special purposes.

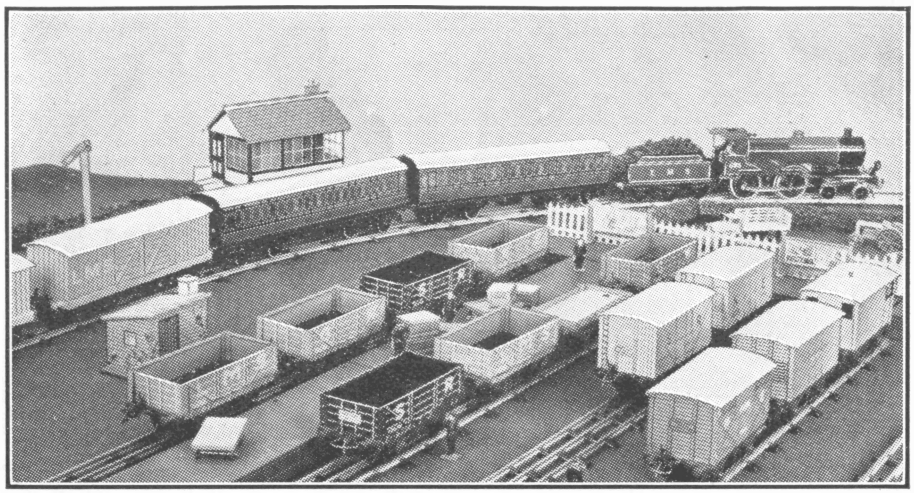
Let us start with the No. 1 Luggage Van. This represents one of the commonest of all freight vehicles, the ordinary covered wagon, or "box van" as it is sometimes known. The No. 1 Luggage Van is a four-wheeler and conforms with the usual Hornby standards of construction in having sliding doors. It is enamelled and lettered to represent the covered vans of each of the four main line railways. It can be used on almost every miniature goods train, and when required it can also be conveyed by a passenger train, as in actual practice most covered vans are suitable for this.

Those who make a practice of conveying actual loads in their goods trains have plenty of choice as far as freights for the No. 1 Luggage Van is concerned. Miniature loaded sacks, small barrels and cases, and the numerous odds and ends that are used to represent kegs and boxes on most model goods loading "banks" can be used. Anything in fact can be pressed into service that can be made to represent a "packed" load that requires protection from the weather.

A vehicle similar in general construction but quite differently finished is the Gunpowder Van. This, except for the G.W.R. model, is finished in red as an indication of the dangerous nature of its load. The G.W.R. Van is finished in the normal grey of that company's goods stock, but has special markings on its doors, and the initials "G.P.V." instead of the inscription "*Gunpowder Van*" that is found on those of the other three systems.

Gunpowder Vans are subject to special arrangements when they are being conveyed from point to point. Naturally the greatest care has to be exercised in loading and unloading them, and "Shunt with Care" is an injunction that really has to be obeyed. Loaded gunpowder vans are invariably conveyed at the rear of a train, and the same arrangement can be followed in miniature. The sliding doors of the Hornby Gunpowder Van allow it to be loaded, and to imitate the usual ammunition boxes and so on, rectangular blocks of wood a little larger than the Hornby Imitation Bricks will do quite well.

From the No. 1 type of van we pass to the bogie No. 2 Luggage Van. This is quite a large vehicle that is very useful for general traffic, and in addition it can be used for various special purposes. It has large opening doors that permit a generous load to be stowed away conveniently, and for general traffic larger consignments of the items suggested for the No. 1 Luggage Van can be conveyed. It can be used to represent the high-capacity vans used by several of the main line railways, such as the "Covfits" familiar in the North Eastern Area of the L.N.E.R., or the large vans used for express traffic on the G.W.R.

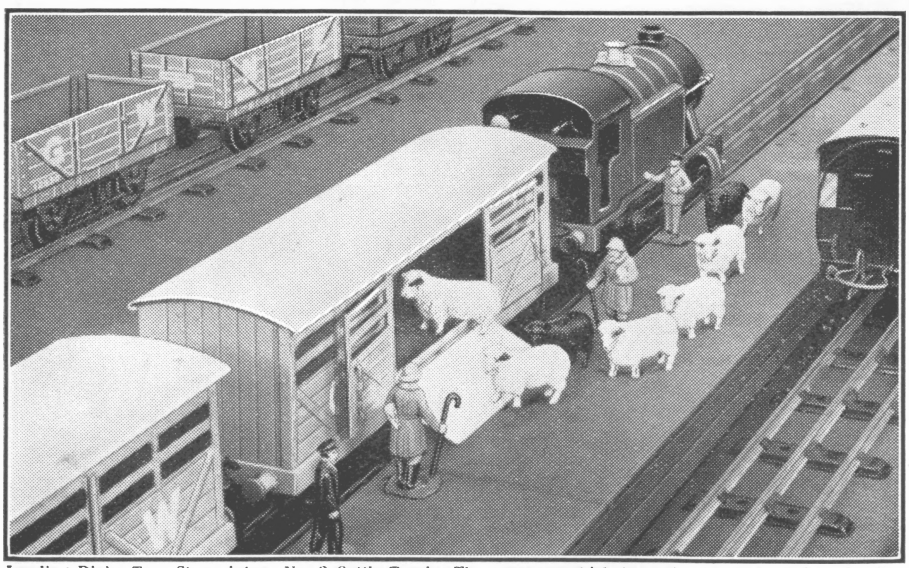


An L.M.S. express on the main line passing some sidings. In the rear of the train the No. 2 Luggage Vans are used as newspaper vans "returning empty" as suggested in this article.

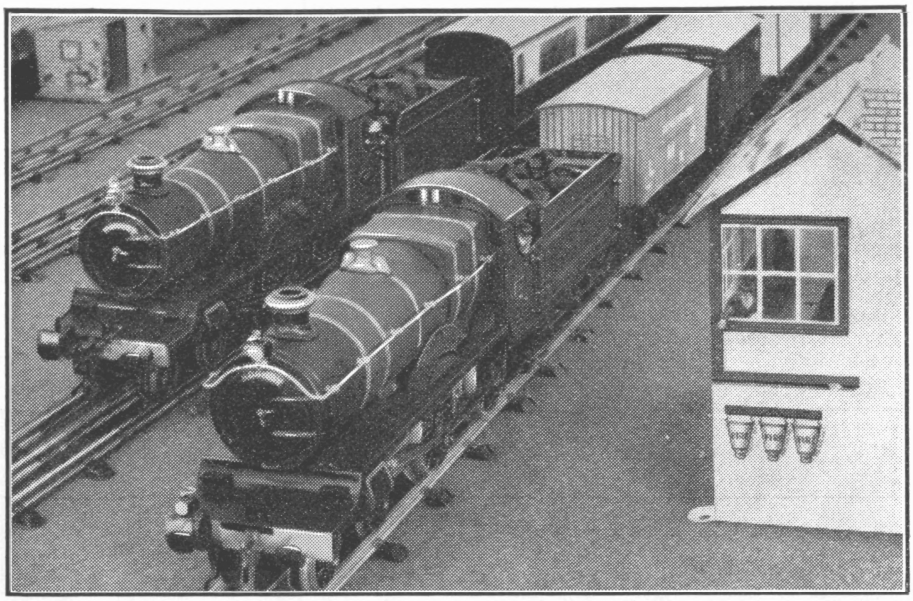
An interesting use to which the No. 2 Luggage Van can be put is for the conveyance of motor cars. Large vans for this and other similar purposes are in use on most of our railways, of which the "General Utility" vehicles developed by the L.M.S. and the S.R. are good examples. These of course can be used on passenger or goods trains as required, and the same practice can be followed quite correctly in miniature. Dinky Toys Motor Cars can easily be loaded into the No. 2 Luggage Van, and its double doors are of special advantage when the "staff" are manœuvring miniature cars from the platform into the van. A loading "ramp" is easily cut from cardboard to allow the cars to be wheeled into the Van. Older readers of the "*M.M.*" will remember that we have several times published illustrations of this loading operation in progress.

Another purpose for which the Vans can be employed on a Hornby system is the formation of a miniature "newspaper train." Special interest attaches to these "night flyers," which cover the greater part of their journeys in the very small hours. This business is important, and in some cases complete trains of miscellaneous brake and parcel vans and similar vehicles are necessary. Occasionally one sees the "empties" returning by day, and sometimes where an odd Van or two is detached from the main train and worked forward to a destination in the loaded direction, the "empties" are conveyed as part of a passenger train. This is the situation represented in the upper illustration on this page, where two No. 2 Luggage Vans are running in the rear of an L.M.S. passenger train.

The No. 1 and No. 2 Cattle Truck bear the same relation to one another as do the No. 1 and No. 2 Luggage Vans. Livestock traffic forms an important part of our railways' business and real cattle trucks with their open-topped sides are familiar objects in most parts of the country. Of the two models, the No. 2 type with its hinged door is the easier to "load" with miniature animals, although on smaller layouts the No. 1 Cattle Truck probably will be found quite sufficient.



Loading Dinky Toys Sheep into a No. 2 Cattle Truck. The ramp up which the animals are obediently stepping is cut from a piece of cardboard.



Neck and neck! A Hornby G.W.R. passenger train overtaking a fast goods train running on a parallel track. Both the engines are E220 Special "County of Bedford" models.

G.W.R. Practice in Miniature

WE return this month to a favourite type of article, dealing with the reproduction with Hornby Railway material of the characteristic practice of a real railway, or of a section of line. This time we turn our attention specially to the G.W.R.

G.W.R. equipment is well represented in the Hornby Series. Swindon rolling stock has many distinctive features, and the smart brown and cream livery is well reproduced in the tinprinted finish of the Hornby No. 2 Corridor Coaches. These are available either as coaches with full passenger accommodation, or as composite vehicles having some passenger compartments and the remainder of the space for the guard and luggage. A complete train of these vehicles vestibuled together with the standard Corridor Connections and provided with suitable roof boards—another notable G.W.R. feature—has a really splendid appearance.

Hornby Train Name Boards bearing the titles of such well-known long-distance trains as the *"Cornish Riviera Express"* and the *"Torbay Express"* allow miniature G.W.R. expresses to be appropriately named.

Shorter-distance and local trains such as the services between Paddington and Reading, or Slough, can be run equally well with the compartment-type No. 2 Coaches. For smaller systems generally, or for suburban "set trains" the No. 1 Coaches and Guard's Vans are very useful. Both No. 1 and No. 2 types have similar outlines and finish so that they will mix quite well.

The Swindon family of locomotives have long been noted, except for certain smaller types, for their domeless boilers crowned with a distinctive safety-valve casing, and all Hornby Locomotives in G.W.R. colours have this feature. Probably the most popular Hornby G.W.R. express passenger engine is the E220 *"County of Bedford,"* with the corresponding clockwork No. 2 Special. This is a true-to-type model whose tapered boiler and copper-finished chimney give it such a strong resemblance to the real G.W.R. engines.

Well known too are the E320 and No. 3C *"Caerphilly Castle"* Locomotives, which can be used for as wide a variety of duties as the real "Castles," "Halls," "Manors," and "Granges." Both the Hornby *"County"* and *"Castle"* types have miniature 4,000 gallon tenders with high sides, such as are fitted to the majority of big engines on the G.W.R. nowadays.

Particularly useful are the E120 Special and clockwork No. 1 Special Locomotives, both tender and tank. These fill approximately the same place in miniature as the real "Mogul" or 2-6-0 tender engines and the "Prairie" or 2-6-2 tanks. Local and intermediate services, both passenger and goods, can be run with these engines, for they are essentially of "mixed-traffic" design. "Residential" trains such as the Reading series previously referred to are best handled by the E220 or No. 2 Special Tank.

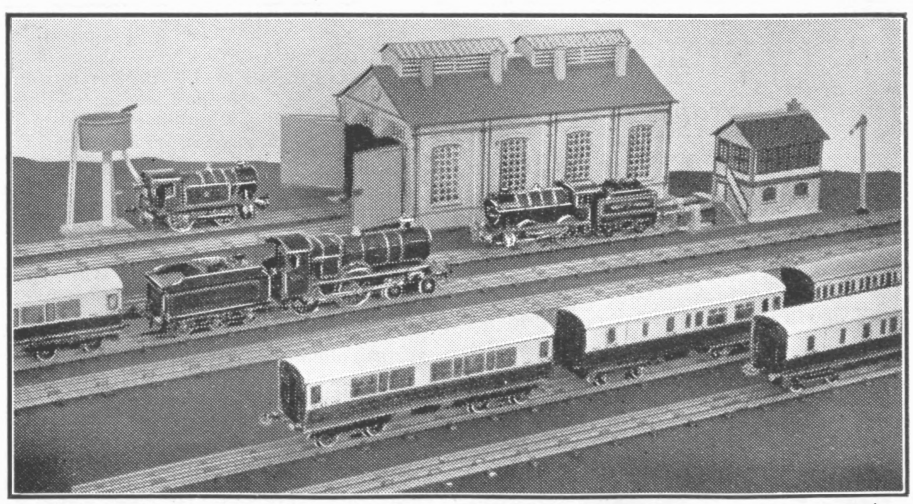
Many interesting examples of G.W.R. freight stock are represented in the Hornby range, and particular attention was devoted last month to the characteristic No. 0 Meat Van and Refrigerator Van that reproduce extremely well the "Mica" and "Mica B" vans of real practice. With these, and the No. 0 Fish Van that so closely resembles the real G.W.R. "Bloaters," as fish vans are called by the Swindon authorities, some splendid "perishable" trains can be made up.

Coal traffic is a feature of G.W.R. practice, and this is well catered for in the Hornby Series. There is the very fine No. 2 High Capacity Wagon G.W.R. that represents the 40-ton vehicles used for "Loco Coal," as the word "Loco" on the side of the model indicates. G.W.R. 20-ton all-steel coal wagons and hopper wagons have a corresponding model in the Hornby Hopper Wagon.

General freight traffic is well provided for by means of the Hornby Luggage Van, and there are special vehicles such as the No. 2 Lumber and Timber Wagons that closely correspond to the long bogie G.W.R. *"Macaw"* wagons. The Trolley Wagon is the Hornby counterpart of the G.W.R. *"Crocodile."*

A special feature of G.W.R. working that makes an interesting novelty when reproduced in miniature is the running of pull-and-push trains for local and branch line work. In actual practice the engine, invariably a small tank, pulls the trains of one or two coaches as usual in one direction. To save running round and the necessity for a loop line for this purpose, the engine pushes its train on the return journey, special arrangements being made to allow the engine to be controlled from a driving compartment at what now becomes the leading end of the train. The driver thus rides on the engine when the latter is pulling but he is accommodated in his driving compartment on the train when the engine is pushing, the fireman remaining on the footplate all the time.

On a Hornby railway an EM320 or M3 Clockwork Tank makes an ideal engine for "pull-and-push" rail motor service. It can be used in conjunction with a No. 2 Brake Composite, which has end windows and is thus suitable for use as a "driving trailer" vehicle.



An express of Hornby No. 2 Corridor Coaches hauled by a "County of Bedford" locomotive getting away along the main line, while an E120 Special Tank waits at the Water Tank.

A Remarkable Local Train Service

(Continued from page 41)

from Watford to this point had taken only 14¼ min., and we could have reached Euston comfortably in 17¾ or 18 min.; but there was a signal check outside and we took exactly 19 min. instead of the 21 min. booked. When I reached the office that morning and told some of my colleagues that for 9 miles of our 17½ mile journey we had averaged 79.3 m.p.h., I am sorry to say they did not believe me! But the run merely serves to show that for speeding with light loads, or for heavy pulling, as on the 8.26 a.m. up, the L.M.S. 2–6–4s are second to none among British tank Locomotives.

Stamp Collecting

(Continued from page 65)

Does "London Batt" mean Battersea, London, or, as a facetious friend suggests, "Battle of London"? Does it mean that the Battersea Post Office has been bombed out of existence and a temporary office brought into use? Or, and this is the probable explanation, did Battersea find itself overwhelmed by the Christmas rush of posting and resort to the use of a temporary office for that reason? Tens of thousands of envelopes must have received that unusual cancellation, but it is equally certain that only a very few found their way to stamp collectors and have survived. In other words, they are rare, and although postmarks do not command the same prices as stamps, there are many collectors who concentrate on them and pay handsomely for rare items.

The World's Largest Aquarium Tanks

(Continued from page 39)

they communicate by squeaking through their blowholes, and they swim with a galloping motion.

Besides their other duties the staff have to keep a close watch on the public. Hardly a day passes without their having to take away a fishing rod from some enthusiast, who is then asked; "Would you take a rifle to a zoo."

"Skybirds"

Readers will regret to learn that "Skybirds" are out of action. The interruption is only of a temporary kind, however, until new arrangements for production have been completed. In the meantime all communications for "Skybirds" should be addressed to A. J. Holladay and Co. Ltd., c/o Cotman Hooper and Co., 10, Coleman Street, London E.C.2.

R. H. KIERNAN'S

biography of

Baden-Powell

You will want this life story of the Chief Scout, which tells of his early career as a soldier in South Africa, as an artist and an intelligence agent. It is by the author of *Lawrence of Arabia*, etc. *Illustrated. 4/- net.*

A HARRAP BOOK

Life-boat Service in 1940

For the life-boat service the year 1940 was the busiest in its whole history of 117 years. All previous figures were far surpassed. Life-boats were launched to the rescue 1,078 times, and of these launches 638 were to vessels in distress on account of the war. The number of lives rescued was 2,052, or 854 more than ever before in one year. Life-boats helped to save 87 boats and vessels from destruction. Many launches also were made to aircraft down in the sea, and 26 airmen were rescued from them.

During the year the Royal National Life-boat Institution awarded 27 medals for gallantry. One of these awards was its gold medal, the V.C. of the life-boat service. It was won by Coxswain Robert Cross, of the Humber, who has now won the Institution's gold medal once, its bronze medal once and its silver medal three times. His station has the outstanding record of the war. It has rescued over 200 lives.

Two Kentish coxswains won the Distinguished Service Medal for their gallantry in the evacuation from Dunkirk. They are coxswain Howard Knight, of Ramsgate, and coxswain Edward Parker, of Margate.

The Institution has awarded its silver medal to Coxswain William McAuslane, of Troon, Ayrshire, its bronze medal to the motor mechanic, Albert J. Ferguson, its thanks inscribed on vellum to each of the other six members of the crew, and £3 16s. 6d. to each man, for a rescue in which great courage and splendid seamanship were shown. A small Irish steamer, the "*Moyallon*," of Belfast, was anchored off a lee shore on 6th December 1940 in a north westerly gale, with a very heavy sea running, and fierce squalls of hail. Her engine had broken down, and she was helpless. She was sheering about and rolling so violently that at times her keel could be seen. By the light of her searchlight, the life-boat tried every way of getting alongside, but this was impossible. Calling on the steamer's crew to stand ready, the coxswain therefore drove the bow of the life-boat right against the steamer, and held it there with his engines, while the seven men of the steamer jumped aboard. The life-boat got back to her station, damaged, but seaworthy, having been out in the gale for nearly eight hours.

A Useful Catalogue for Model Railway Enthusiasts

The latest edition of the model railway catalogue of the well-known Northampton firm of Bassett-Lowke Ltd. is remarkably complete and interesting in spite of the effects of the war that are necessarily felt in the commercial side of model making. A special feature is made of locomotives that are built to customer's requirements and for exhibition work generally. There is rolling stock, both goods and passenger, and both all-metal and wooden vehicles are included in addition to a series of goods wagons and vans with bodies of plastic moulded material.

Perhaps the most useful and interesting sections are those devoted to items, such as track and signals, that are particularly adapted to assembly at home from component parts to suit the requirements of the individual model railway owner. Then there are the wheels, bogies, buffers and other parts that are so necessary to the model maker.

Electrical apparatus necessary for operating electric model railways is dealt with and those anxious to build a steam locomotive and be sure that it will work satisfactorily when finished will welcome the special sets of parts ready to be assembled into models of the L.M.S. Stanier 2–6–0. The 44 pages of the catalogue are packed with useful information, and are well illustrated. The price is 6d. post free from Bassett-Lowke Ltd., 16/20, St. Andrews Street, Northampton.

Rear view of a 110-ton lorry, driven by a Diesel engine, that was built in France. The lorry has 18 wheels. A view of the front end appeared on page 489 of our November 1940 issue.

A Tractor Photograph Contest

David Brown Tractors Ltd., Meltham, Nr. Huddersfield, are holding a series of attractive photographic competitions in which the subject is a "David Brown" tractor at work. This may be shown ploughing, cultivating, seeding, harrowing, threshing or hauling, or engaged in any other seasonal operation. The more unusual the subject the better.

The closing date of this contest is 31st March, and a prize of 3 guineas will be given for the best photograph received. In addition reproduction fees of 10/– may be awarded to other competitors. Both negative and print should be sent when entering the competition, and the name and address of the entrant must be written on the back of the print. The negative will be returned after judging. Entries should be addressed to the Publicity Manager, David Brown Tractors Ltd., Meltham, Nr. Huddersfield, from whom full details of the contest can be obtained.

Johnson and Sons Photographic Competition Results

Below we give a list of prize-winners in the 5th of the monthly photographic competitions arranged by our advertisers Johnson and Sons Ltd., Hendon Way, Hendon, London N.W.4. This was the fifth of the series that closed on 30th November, 1940. It is hoped to arrange a similar series of contests during 1941, commencing in spring. Details of this will be given in the Magazine, and readers who are interested in photography should keep a look out for it.

First Prizes, £3 each: Mr. E. Haslam, Oldham; Mr. F. H. Sharman, Beckenham.

Second Prizes: £2 each: Mr. R. Barraud, Wollaton, Nottingham; Mr. J. A. Carpenter, Harrogate.

Third Prizes, £1 each: Mr. A. H. Hamilton, Motherwell; Miss L. E. Watts, Whitley Bay; Mr. R. Moore, Harkingside, Essex.

Fourth Prizes, 10/– each: Mr. M. Popplewell, Scarborough; Mr. H. Crabtree, Shipley; Mrs. I. Mathias, Sutton Ings, Hull; Mr. E. C. I. Macdonald, Gosforth, Newcastle-on-Tyne; Mr. C. Lockhart, Doncaster; Mr. W. Lee-Thomas, Leominster.

COMPETITIONS! OPEN TO ALL READERS

An Interesting Cipher Contest

The articles on ciphers that have appeared in the last two issues of the Magazine have aroused the greatest interest among readers, who have thoroughly enjoyed solving the puzzles they have met with in them. Many indeed have set us cipher puzzles in return! Because of this obvious liking for the detective work involved we have decided to make a simple substitution cipher the centre of our contest this month.

The passage that we are asking competitors to decipher is given in the panel on this page. It looks as if it cannot possibly have any meaning, but we assure our readers that it can easily be deciphered and will then be found to be part of the story of a famous parachutist. Each of the letters represented in the original has been changed to another letter in order to obtain the ciphered passage in the panel. What is required is to find exactly what substitutions have been made and to write out the original passage.

Those who have followed the cipher articles should have no difficulty in applying the methods that have been described. Actually any competitor should be able to find the solution if he remembers that the letters that usually occur most frequently in English are E, T, A, O and N, and if he makes full use of such facts that the only single letter words are I, A and O and that "The" and "And" are the most frequent of three letter words. He should also keep a lookout for double letters, those most often met with doubled being E, O, S, L and F. Once a start is made by recognising the ciphers for the letters indicated it is fairly easy to detect longer words, and from that to go on to decipher the entire passage.

There is one point about which we should warn readers. One of the letters that is most often used in the passage in the panel does not belong to the group of the five letters that usually occur most frequently. With this hint as a guide we do not think any reader will go astray, and indeed we have already given the clue to the letter to which we are referring.

T tsliatihyc ezia kex giairpfkzw, sxk hzrifwz t pilz sx ditkp ts xsz iyxsz, hfk hzrifwz tk tw xhltxfwyc bxaz wzswthyz kx ezia kex epzs xsz ris ox wx. Iw t wkiso eitktsq xs kpz hxkkxb etsq dxa kpz atqpk bxbzsk kx oaxg, t dirz kpz kitygyisz iso eikrp kpz dtzyo iso raxeo hzyxe. Bc yiwk irk hzdxaz wkzggtsq tskx wgirz tw kx wzz kpik bc giairpfkz atsq tw ts tkw gxrvzk. Iw t diyy t ox sxk qaih tk daisktriyyc iso gfyy. Tswkzio t kivz bc ktbz, dxa znrzgk epzs mfbgtsq dxa ytdz ik is znkazbzyc yxe iyktkfoz tk tw lzac oisqzaxfw kx gfyy kpz atsq eptyz yziltsq kpz itaraidk.

There will be prizes of Meccano Products to the value of 21/–, 15/–, 10/6 and 5/– respectively for the senders of the four best solutions in order of merit, and a number of consolation prizes will also be awarded. There will be a separate section of this contest for Overseas Readers, with prizes of the same value as those in the Home section. In the event of a tie for any of the prizes, the judges will give preference to competitors displaying the neatest or most novel arrangement.

Entries must be addressed to *"Cipher Contest,* Meccano Magazine, Binns Road, Liverpool 13." The closing dates are 28th February in the Home section, and 30th June Overseas.

HORNBY RAILWAY CONTEST

Can You Identify These Engines?

This month we introduce a novel contest that should interest every keen railway enthusiast. Below a short description is given of a railway journey on which many interesting locomotives were seen, and competitors are required to identify these from the clues given in the account. Every reader of the Magazine can enter this contest.

The name of the class, the wheel arrangement, and the owning company should be given for each engine, and the winners will be those who give the most correct lists. In the event of a tie for any prize, preference will be given to neatness and general presentation.

While making a recent railway journey, I happened to glance out of the carriage window when we were passing through a large junction station with an engine shed near by. The first engine I saw was a very small one; it was an 0-4-0 with saddle tanks and outside cylinders, a very short wheelbase and no rear coal bunker. The coal was carried in two boxes on either side of the fire-box. A "stovepipe" chimney was fitted, and also large buffers. Standing next to this was a larger engine. It was similar to a standard L.M.S. 4-4-0, but it had straight frames and a rather small boiler. A Midland type tender was fitted, and it had large splashers over the coupled wheels.

On the turntable was a large boilered express locomotive painted red. This had a very distinctive look about it. A long slotted valence ran almost the whole length of the frames. A large rectangular splasher was fitted over the rear wheels. The coupled wheels had large centres, and smoke deflectors were fitted alongside the smoke-box, which had a very small chimney. Just then another train passed us going in the opposite direction. The engine was a fairly large black one with outside valve gear but no outside cylinders, and for this reason it seemed very peculiar.

As we were passing a small goods yard, a 0-6-0 tender locomotive was shunting some wagons. It had a small boiler and very large cab. When we stopped at the station I alighted for a few minutes and walked along the platform. Presently I heard a train coming in. It was hauled by a fine-looking locomotive whose main characteristics were a large boiler, deeply sloping Belpaire fire-box and high frames. When it started again the exhaust from this engine came in short rapid puffs, which seemed to suggest that it was either a three or four cylinder engine. Then coming in on another line was a local passenger train hauled by a small black tank engine with a very tall chimney and small coupled wheels of unusual design.

Hurrying back to my train, I observed that a change of engines had been made. For the next stage of the journey we were being hauled by a big express tank engine which had a large tapered boiler, huge side tanks and a very comfortable side-window cab.

The contest is divided into the usual sections, for Home and Overseas readers, and in each prizes to the value of 15/–, 10/6 and 5/– will be given for the three best entries in order of merit. In addition a number of consolation prizes will be awarded. Envelopes containing entries should be marked *"Railway Journey Contest,* Meccano Magazine, Binns Road, Liverpool 13," and those in the Home section should be posted to reach headquarters on or before 28th February 1941. The closing date in the Overseas section is 30th June.

COMPETITION RESULTS

HOME

December "Advertisement Jig-Saw Puzzle" Contest.—1. A. H. B. Lee (Leeds 6); 2. J. W. Stark (Glasgow S.1); 3. D. Copeland (Potters Bar); 4. R. A. Wood (Middlesbrough). Consolation Prizes: J. E. Andrew (Sheffield); P. Mawson (Leeds 7); M. Rang (London N.W.3); F. C. Whalley (Wallasey).

Christmas Drawing Contest.—1st Prizes: Section A, P. H. W. Weston (Bromley); Section B, J. P. Tyrell (Walton-on-Thames). 2nd Prizes: Section A, A. Sunderland (Cheadle Hulme); Section B, W. Harding (Walton-on-Thames). Consolation Prizes: S. McLean (Rainhill); G. J. Lewys (Llanedeyrn, Nr. Cardiff); D. Lindsay (London N.12).

December "Railway Questions" Contest.—1. M. Firth (Huddersfield); 2. L. Carter (Kenton); 3. D. Davenport (Timperley).

OVERSEAS

September "Engineering Story" Contest.—1. D. Shaw (Montreal); 2. E. Roberts (Wellington, N.Z.); 3. H. Charles (Alberta, Canada); 4. G. Myburgh (Claremont, S.A.).

FIRESIDE FUN

BREATHING FREELY

A concert was being given for the troops billeted in a small town. They were packed into the hall like sardines in a tin. An officer went up to the stage and asked if any of the Tommies had any ideas to aid them to breathe more freely.

A voice piped up from a back row, saying, "Number off from the right, and tell the even numbers to breathe in while the odd numbers breathe out."

* * * *

Visitor: "If your mother gave you a large apple and a small one and told you to divide with your brother, which apple would you give him?"

Johnny: "D'ye mean my big brother or my little one?"

* * * *

Recently the following testimonial was received by a patent-medicine concern: "For nine years I was totally deaf, and after using your ear salve for only 10 days I heard from my brother in China."

* * * *

Jim: "So you got your B.A. and M.A."

Charlie: "Yes, but my P.A. still supports me."

* * * *

Two negroes were boasting about the merits and qualifications of their respective motor cars, both typically worn, shabby, old wrecks.

One of them said: "Dey's jus' one reason why Ah cain't run disheah cab o'mine 200 miles a houah."

"An' what's dat reason?" asked the other.

"De distance is too long fo' de shawtness of de time," said the first.

* * * *

Professor: "And are you sure that this story is original?"

Student: "Certainly it is."

Professor: "Well, well! I didn't think that I would ever live to see the day when I would meet Rudyard Kipling."

* * * *

"Pa," said Johnny, looking up from his composition, is waterworks all one word or do you spell it with a hydrant?"

* * * *

"Mose," said Eph, "what animile is de mos' noted fo' its fur?"

"De skunk," said Mose, positively. "De mo' fur yo' gits away fum him de bettah it am for you."

* * * *

The village minister was explaining why he never invited other ministers to preach in his pulpit.

"If another man came and preached better than I do," he said, "my folk would never listen to me again, and if he didn't preach better than I do, he wouldn't be worth listening to."

* * * *

"Ha, ha, ha!"

"Why are you laughing?"

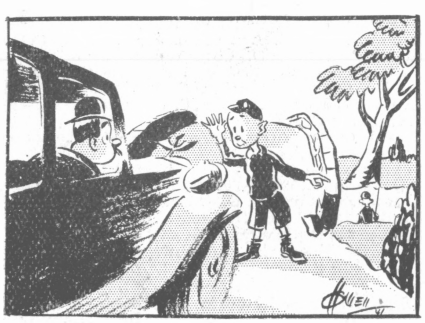
"Somebody has stolen my car."

"Do you laugh at that?"

"Yes, the fellow will get a shock when he finds that he has 24 instalments to pay on it."

* * * *

QUIET, PLEASE!



"What's the matter, sonny?"

"Don't go fast over the bridge, mister! Me brudder's got a nibble."

PERILS OF THE PROFESSION

Lady: "You poor man! Does nobody offer you work?"

Tramp: "Yes, lady, now and then. But generally speaking I meet only with kindness."

* * * *

Mamma (dining out): "It isn't polite, Bobby, to smack your lips when eating. You never do that at home."

Bobby: "'Cause we never have anything worth smacking over."

* * * *

Cob: "Where do flies go in the winter time?"

Blob: "To glass factories to make blue-bottles."

* * * *

Tim: "What happened to the boy who swallowed a spoon?"

Jim: "He couldn't stir."

* * * *

Mike got a job moving some kegs of gunpowder, and to the alarm of his foreman, was discovered smoking at his work.

"Suffering cats!" exclaimed the foreman. "Do you know what happened when a man smoked at this job last year? There was an explosion that blew up a dozen men."

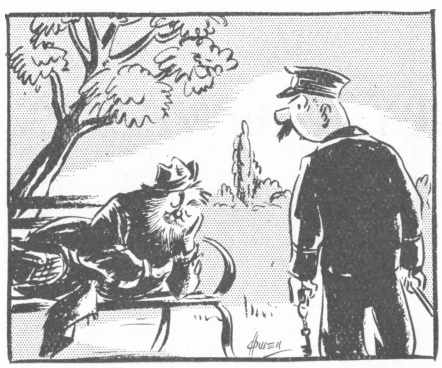
"That couldn't happen now," returned Mike calmly.

"Why not?" asked the other.

"'Cause there's only you and me," was the reply.

* * * *

WEARY WILLIE



"Come on now: I'm going to lock the gates."

"O.K. Don't slam 'em!"

* * * *

Asked to paraphrase the sentence "He had a decided literary bent," a scholar gave this version:

"He was very round-shouldered through excessive writing."

* * * *

Choir boy: "What made you resign from the choir?"

Ex-choir boy: "I was absent one Sunday and someone asked if the organ had been mended."

* * * *

Richard: "You ain't yo'se'f no mo. Sick or sump'n?"

Rastus: "Ah got insomnia. Ah keeps wakin' up ev'y few days."

* * * *

Old Gent. (giving conductor half-a-crown for a penny fare): "Would you give me a shilling, two sixpences, a threepenny bit, and the rest in coppers as change?"

Conductor (sarcastically): "Are there any particular dates you want?"

* * * *

Tourist: "Tell me, what does a small town like this do with such a big hospital?"

Native: "Stranger, this road has more traffic than any other in the country."

* * * *

A doctor received the following note:

"Please call and see Mr. Jones. It's his head. He's had it off and on all yesterday and now all to-day. He's absolutely beat with it."

* * * *

THIS MONTH'S HOWLER

A navigator is a strap round a navvy's legs to stop insects crawling up his trousers.

ALL THERE

A little girl was put into an upper berth in a Pullman for the first time. She kept whimpering until her mother told her not to be afraid because the angels would watch over her.

"Mother, are you there?" she cried, plaintively.

"Yes, dear."

And a few minutes later, "Daddy, are you there?"

"Yes."

A fellow passenger lost all patience after so long a time and bellowed forth. "We are all here. Your daddy and mother and brothers and sisters and aunts and uncles and cousins. All here: Now go to sleep, little one!"

There was a pause. Then very softly: "Mother."

"Well?"

"Was that one of the angels?"

* * * *

CHEERFUL!

Mountain Guide: "Be careful not to fall here. It's dangerous. But if you do fall, remember to look to the left. You'll get a wonderful view."

* * * *

Rastus was sent to the general store. "My boss," he said to the clerk, "wants a pane o' glass nine by 'leven."

"Hain't got none that size, Rastus," said the joking clerk, "but will a 'leven by nine pane do?"

"I'll try'er" replied Rastus; "Mabbe if we slip'er in sideways nobody'll notice it."

* * * *

Old Gentleman: "You're an honest boy, but it was a £10 note not ten £1 notes I lost."

Small Boy: "I know, mister, it was a £10 note I picked up, but the last time I found one the man who owned it didn't have any change."

* * * *

Teacher: "Yes, children, an Indian wife is called a squaw. Now what do you suppose Indian babies are called?"

Bright Pupil: "I know—squawkers."

* * * *

Artist: "I'll give you five shillings if you'll let me paint you. It's easy money."

Old Countryman: "Thar hain't no question 'bout that, but I'm jes' a-wondering how I'd git the paint off afterwards!"

* * * *

Sam had just passed the Army medical examination. He said to the examiner: "Boss, Ah'd lak to ask one favour, now you is got me in de army."

"And what is that?" patiently asked the examiner.

"Don't put me in de cabalry."

"What's your prejudice against the cavalry?"

"Boss, when Ah's tol' to retreat, Ah doan want no hoss around to git in mah way!"

* * * *

ANOTHER TONGUE TWISTER

Old oily Ollie oils old oily autos.

* * * *

A little girl was seated on the front porch when a salesman approached.

"Mother at home, little one?" he inquired.

"Yes, sir," said the child.

The salesman rang the door-bell. There was no response. He rang it several times more, but the door remained closed. Then he turned to the child and asked: "Didn't you say your mother was home?"

"Yes, sir, I'm sure she is," replied the youngster.

"Then why doesn't she answer my ring?"

"I think she will, sir, when you reach our house" came the reply. "We live four doors down the street."

* * * *

Diner: "I don't think that sandwich was quite fresh."

Waiter: "It must have been sir. Every sandwich is wrapped in transparent air-tight paper."

Diner: "Oh dear! I wish I'd known about the paper."

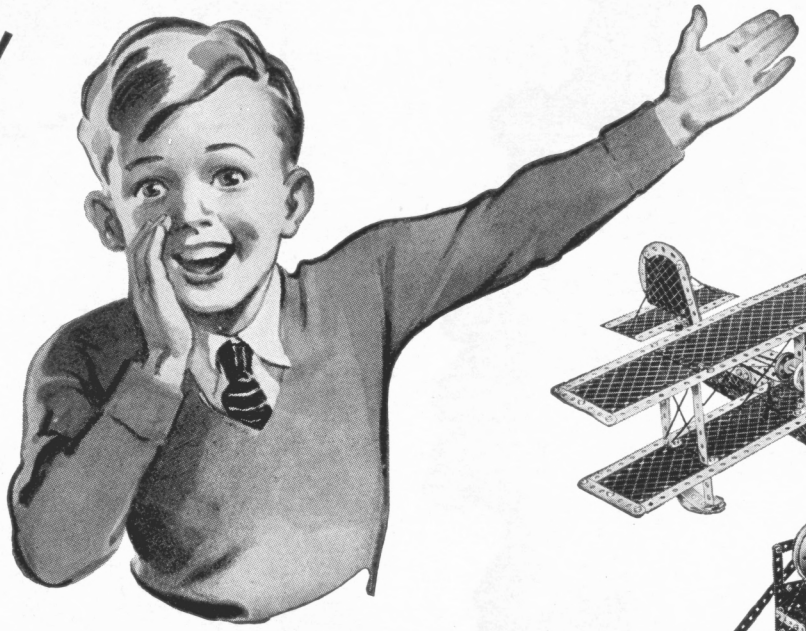
* * * *

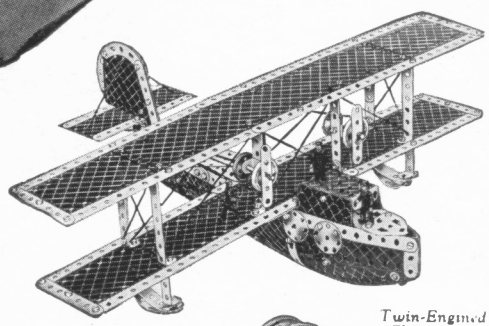
"Did you hear that the fire department got rid of their efficiency expert?"

"No! Why?"

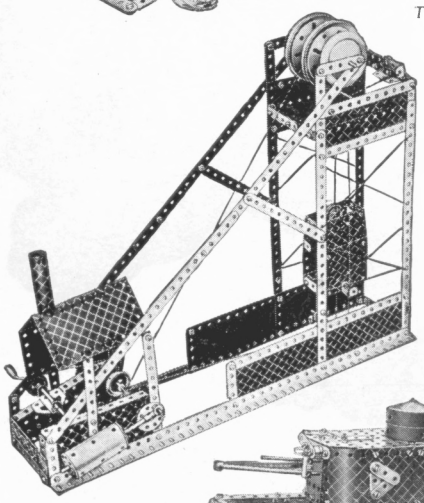
"He put unbreakable glass in all the fire alarm boxes."

THE KING OF INDOOR HOBBIES

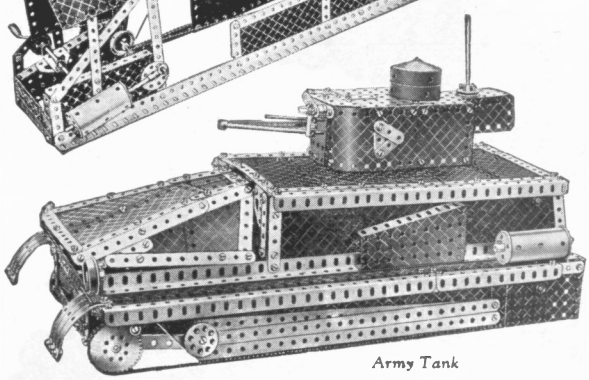




Twin-Engined Flying Boat



Pit Head Gear



Army Tank

No other hobby touches Meccano for fun, interest and entertainment. It's thrilling to build grand working models of cranes, bridges, engines and hundreds of other engineering marvels in miniature. It's better still to make the finished models work just like the real thing! There's simply no end to the things you can make and invent with Meccano!

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PUBLISHED BY MECCANO LTD., BINNS ROAD, LIVERPOOL 13, ENGLAND.
Printed by John Waddington Ltd., Leeds and London.